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DIGITALISATION OF THE PERMIT PROCESS FOR THE BUILT ENVIRONMENT IN FINLAND

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SUMMARY

In the early 2000s, the first cooperation projects on creating formalised interfaces for the built environment were initiated in Finland.

The first projects aimed at the digitalisation of the permit process for the built environment were kicked off in 2008 by the Association of Finnish Local and Regional Authorities and the Ministry of the Environment. In addition to increasing cost savings and operational efficiency, the objective was to enable collaboration across municipal boundaries.

In 2011, a joint project between municipalities and companies was started under the SADe initiative, which resulted in the creation of Lupapiste, an electronic service for processes pertaining to the built environment, in 2013.

In order to succeed, the digitalisation of service access required a robust public organisation, integrations into back-end systems and extremely close cooperation with the pilot municipalities. In addition to this, a neutral third-party operator was required to ensure that the various parties managed to make the appropriate progress.

In Finland, RTY (The Finnish Society of Building Inspectors) has played a key role in this regard. In its annual meeting in 2017, RTY stated that bolstering electronic service access and paper-free processes should also be emphasised in the internal processes of building control.

Evolta Ltd is responsible for the development, training and maintenance activities related to the electronic services. The company provides a new update for the open-source cloud service approximately every two weeks. The service is developed in constant cooperation with municipalities.

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TABLE OF CONTENTS

Background

In the early 2000s, municipalities and authorities had developed electronic services, but their utilisation rate had remained below 10 per cent.

In 2008, the Association of Finnish Local and Regional Authorities initiated the RAKESA project on electronic services and archiving in building control and construction. The implementation involved a vast municipal consortium and 50–100 municipalities, which committed to investing in the digitalisation of the drawing archives maintained for building control purposes.

The aim of the RAKESA project was to standardise the various forms, procedures and information templates used in the permit process. Another goal was to harmonise the legislation and its interpretations, along with increasing the efficiency of operations across municipal boundaries.

Between 2009 and 2010, the Ministry of Finance worked together with the Association of Finnish Local and Regional Authorities to start the KuntaGML[1] project, which involved the implementation of open interfaces. The idea was to open the municipalities' existing geographical data pools and create formalised interfaces. As a concrete result, the KuntaGML project produced the KRYSP interfaces[2] in 2010.

Initially, the Association of Finnish Local and Regional Authorities financed the development efforts of the back-end system suppliers to open the building control interfaces. After this, the Ministry of the Environment funded the development further, so that the interfaces could be made functional and compatible.

The KRYSP interface implementation has enabled the electronic service portal (Lupapiste) to be integrated with map materials, municipal registers and back-end systems.

From the outset, the development was driven by strong cooperation and the shared determination of the various actors involved.

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[1] Programming language
[2] Electronic interfaces for the built environment of municipalities

Steps of the service implementation

2009	Project study
2010	Project plan
2011	Technical requirement specification for the service
2011	Competitive bidding for operators
2011	Selection of pilot municipalities
2012	Commencement of the project
2012	Interface implementation
2012–2014	Meetings of the steering groups formed by the pilot municipalities
2013	Commissioning
2014	Commencement of business operations and private operation

Initiation of change

DIGITALISATION OF THE PERMIT PROCESS

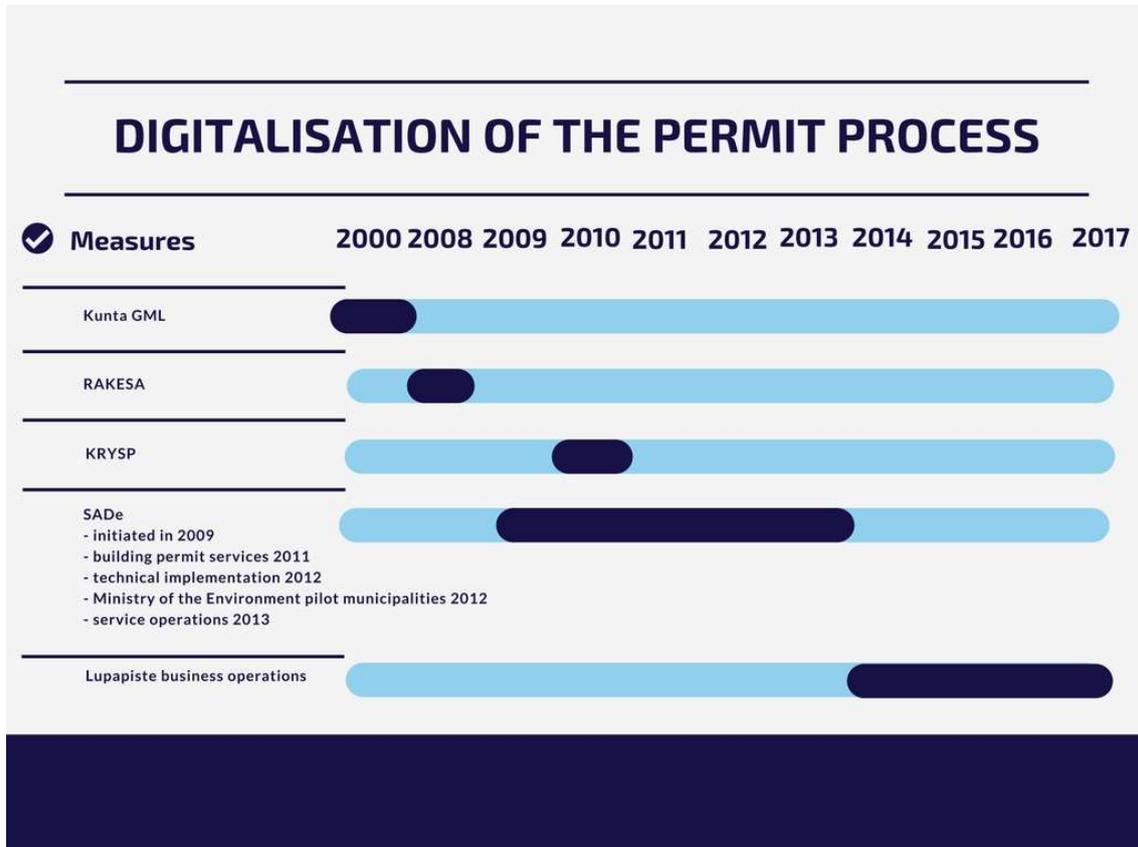| ✔ Measures	2000	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Kunta GML											
RAKESA											
KRYSP											
SADe - initiated in 2009 - building permit services 2011 - technical implementation 2012 - Ministry of the Environment pilot municipalities 2012 - service operations 2013											
Lupapiste business operations											

Figure 1. Significant technical milestones

SADe – Action Programme on eServices and eDemocracy

The efforts to further the availability of electronic services relating to the built environment were initiated as part of the SADe programme towards the end of 2011. This was a nearly two-year implementation project, which was carried out based on initial and further specifications. The Ministry of the Environment had a strong presence in the analysis efforts.

The specified goal of the SADe project was that citizens should be able to access services through digital channels by the end of 2013 (Government term). The project plan began with a survey on the electronic services that would need to be prepared for citizens and companies, and on the type of architecture to be used.

The project plan stated that the digitalisation efforts should only cover **essential public services**. The ministries were allowed to consider what this meant in each of their areas of responsibility.

The most important policy compared to the old municipal model pertained to architecture: the service access arrangements should be created in a **customer-oriented manner**. As a result, joint services were implemented for municipalities and the state administration, and some administrative boundaries were brought down. The Ministry of Finance declared that it should be possible to use the same portal to access the services of multiple municipalities and state departments.

The aim of the SADe project was to promote electronic service access in such a way that citizens and companies could access all key services via digital channels **by 2013**. Unified customer interfaces for the public services provided by a variety of parties were created through joint efforts.

The following methods required by the Government statement were observed in the implementation of the SADe programme:

- Electronic services must be developed in cooperation with their users, taking **ease of use** into account.
- The **data security** of citizens must be given due consideration in all phases of development. To ensure this, the efforts will be conducted in close cooperation with the Data Protection Ombudsman.
- Solutions offered by the markets and private sector innovations must be utilised in public sector procurements. The use of open information system architectures and **open source code** in public administration systems must be promoted.
- The efforts to develop electronic services must support the production of services in both **official languages**.

The programme succeeded in producing high-quality interoperable electronic services for the public sector nationwide. The services increased cost efficiency and brought savings, and the benefits reached everyone from citizens, companies and communities to municipalities and state authorities.

The programme paid special attention to the attainment of production benefits for municipalities.

This collection of services also involved the implementation of the electronic permit service **Lupapiste**, which can be used to apply for permits related to the built environment and handle the requisite contact with authorities.

Building permit service as part of the SADe programme

In 2010, municipalities and state authorities were given the opportunity to submit ideas on things to consider in the creation of customer-oriented electronic services. After this, the Ministry of Finance commissioned the Ministry of the Environment to analyse the nature of customer-oriented services in the cooperation between the state and municipalities.

This served as a basis for the preparation of a project plan in autumn 2010, which also involved building permit services in accordance with the public administration procedures and guidelines of the Ministry of Finance.

Funding for the plan was secured in 2010. The goal was to create a model in which the joint service portal would connect with the case management and processing systems of municipalities through open interfaces.

In 2011, the preparation of a requirement specification for the service was initiated and a competitive bidding process was arranged to find a suitable supplier. A key principle of the SADe programme was that the services would need to be created with open source code. In the competitive bidding phase, the idea was that the Government IT Share Service Centre (VIP) would provide the service platform for the Ministry of the Environment to implement its applications. The platform would also serve the integration of the service into the separate systems of municipalities.

However, the Ministry of Finance decided against the utilisation of this model. Since all specifications had been prepared with this model in mind, new guidelines and ownership arrangements were necessary.

It was decided that the Ministry of the Environment would carry out the pilot but, upon the conclusion of the SADe programme in 2015, the company that had won the competitive bidding would gain ownership of the service. The Ministry of Finance referred the decision to the service policy committee and gained permission to proceed with this model, provided that the winner of the competitive bidding that would later operate the service would commit to publishing the open source code.

After this, the implementation model and requirement specification were adjusted. This necessitated a new invitation to tender and competitive bidding process. In this arrangement, the Ministry of the Environment undertook to pay for the development and the expenses of 20 pilot municipalities until the end of 2014.

The winning company committed to organising regional meetings with municipalities during the agreement period. Companies interested in implementing the service were then offered the opportunity to provide consultation and present ideas on the invitation to tender before the beginning of the competitive bidding.

Pilot municipalities selected

The starting point for selecting the pilot municipalities was the digitalisation of building permit applications. Municipalities of different sizes and bilingual municipalities were sought for the pilot phase throughout Finland. Järvenpää was the first pilot municipality to get involved.

The implementation of the project began in the summer of 2012, and everything got off to a good start. A decision was made to utilise the open interfaces

prepared by the Association of Finnish Local and Regional Authorities for the Ministry of Finance. Unfortunately, it was found in the autumn of 2012 that the KuntaGML development had failed and there were no interfaces. The Ministry of Finance granted additional funding for the project aimed at additional updates to the KRYSP interfaces, which was carried out as an expansion of the service.

The municipalities were using six different systems for permit processing, and the KRYSP interface update required all of them to be present among the pilot municipalities. At this point, the number of pilot municipalities increased to 30. As a result, the project fell behind the original schedule.

The interfaces were also expanded to cover case management in the environmental sector.

Municipal meetings organised by the Ministry of the Environment were held with the pilot municipalities 4–5 times a year. The meetings covered the progress of the project and the functionalities that the service should include.

Vantage point 2013 – transition of services to daily municipal operations

In March 2013, the first municipality to be included in the pilot, Järvenpää, began the production use of the Lupapiste service. Naantali launched the service as the second municipality in May 2013.

An open request for advice was the first to be introduced. In November 2013, the first orders came in from Iisalmi, Lohja, Uusikaupunki and Uurainen.

Between 2014 and 2015, the business activities of the company operating the service consisted of sales, implementations and training. Wider adoption of the service outside the pilot municipalities was sought through traditional sales efforts throughout Finland.

After the original project until the end of 2015, the Ministry of the Environment commissioned additional development work from the company that had won the original competitive bidding, in accordance with the agreement. Once municipalities were actually using the service, they began presenting development needs, which led to the preparation of an archive in the spring of 2015.

When the SADe programme ended in 2015, it was decided to extend the agreement by three years until 2018.

Case Vantaa: Integration into customer processes through electronic service access and information models

Alongside those involved in the pilot process, other municipalities began showing interest in electronic service access. Among them was the City of Vantaa. Employing some 40 professionals, the City of Vantaa Building Control produced enough paper documents to fill countless shelves each year.

At the beginning of 2011, the City of Vantaa was in the process of preparing a vitality programme, which listed the opportunity to access services through a single point of contact as one of the goals of building control.

At the outset, the situation in Vantaa was characteristic of the time, involving customers preparing drawings and images with electronic tools. However, they were then forced to print them out in six copies to be circulated for statements. After this, the documents were once again scanned into a digital format.

The question was raised: since the customers are already doing everything electronically, would it be possible to implement a platform that would eliminate the need for paper altogether? Vantaa agreed to get involved in the Lupapiste project in May 2014. The decision was easy since the project was run by the Ministry of the Environment and the trial did not involve any costs.

In the spring of 2014, Building Control had decided to institute electronic permit processing for small residential houses as of 1 November (permits can only be applied for and received electronically). A harmonised target result was set up to ensure that all parties were committed to the project's success. In addition to this, the people involved had a genuine desire to adopt new operating models.

The project was implemented through a low organisational structure without separate management teams or steering groups. Representatives and statement contributors from other departments were included in the project. All standard statement contributors – public utility services and the energy, water and environmental centre – became involved.

Information was openly available during the project. An open lunch event was held for all stakeholders once a month, which provided the opportunity to comment on the progress of the project. Computers and displays were updated as part of the project. Two or three larger training events were organised for the customers with the developer of the Lupapiste service. Tailored training for statement contributors was not necessary.

The City of Vantaa Building Control joined the Lupapiste arrangement on 1 November 2014, after which all permit applications in Vantaa were submitted electronically. About ten applicants offered permit applications on paper, which were then scanned. After this, no paper applications were submitted.

In 2015, the performance reward criterion was that all permits must be processed electronically. 2016 involved the development of electronic inspection procedures for construction sites.

In addition to the electronic service platform, Vantaa showed interest in having a digital archive, which was implemented as part of the project in 2016.

Currently, Vantaa is developing the utilisation of information models, modelling, model review programmes and the concept of the CityGML model.

In addition to this, the city has found it necessary to update its decision-making system and facilitate the process. Vantaa is interested in reducing the need to transition between systems. In addition to this, the transfer of the archive into the Lupapiste service supports a model in which all tools use the same platform, reducing the constant need to develop and build new interfaces.

Vantaa is aiming towards a single-system service that provides services related to the submission and processing of applications, construction site operations, archiving and decision-making through a single point of contact.

In the future, reporting tools and invoicing systems can be built around it – even now, an Excel template for invoicing purposes can be created through the Lupapiste service.

The development efforts are based on the idea of a model that facilitates work tasks and improves work flow.

The first 3D permit in Vantaa was prepared in the autumn of 2017 when a cluster of 17 detached houses tested the permit processing arrangement. At the beginning of 2018, Vantaa will make the city measurement department's materials available. This will provide access to information models on all projects carried out in recent years.

The situation in 2018 – requirements for success

The electronic service platform for the built environment is a vast and complex collection of systems and solutions. During the two-year project and the following further development project, a wide variety of parties have been, and still are, involved.

The following can be regarded as preconditions for the successful implementation of the service:

1. strong public/state organisation,
2. integration into back-end systems and
3. close cooperation with the pilot municipalities.

The success of the service required a strong public organisation to drive the project forward. The state body involved funded the efforts, monitored the finances and made the decision to invest the necessary funding. All in all, it was essential that the state support was targeted at the implementation instead of the municipalities directly.

The public organisation was also responsible for coordinating the parties involved in the project. There had to be a decision on the service management model. Instead of being purely business-driven, the service had to be a ministry-driven and municipally-funded arrangement with the resulting appropriate steering group. Expertise was also required on the part of the client.

The state actor had to clearly define the service specifications. The model had to be **customer-oriented**.

Integrations into the back-end systems were key. In addition to this, the payroll information of the municipalities and the state had to be openly available (EU Directive).

The cooperation with the pilot municipalities needed to be extremely close. The municipal meetings held a few times each year were essential for the pilot municipalities. Through them, the actual users could hear presentations of future additions and completed elements.

A neutral third-party operator was also required to ensure that the various parties could push things forward. As an example, in Finland RTY played an important role.

Status of electronic service access in the 2020s

Technology is developing rapidly and digital operating methods have become commonplace. It is likely that the need to transfer information between two systems will be reduced within the next two years. Electronic service arrangements are operational in all municipalities.

The CityGML model[3] is a thing of today – in principle, planners can use Lupapiste to place a project in an information model before the permit decision, or at least do some of the planning via the information model.

The shared visual basis ensures that building control inspectors can see the development of new residential areas consisting of blocks of flats, for example. In the same way, all operators involved can see what the others are doing. If we can provide a simple and easy way of placing projects in an information model, it could even be made a mandatory requirement.

City models and information models will be in use in 2025. In the future, everyone will be able to view the constantly developing city model, which is independent of any specific software[4] and evolves over time. The first municipalities will provide 3D permit drawings that illustrate the building. The coordinates included will be placed in the LOD2 template as an information model[5].

A timeline will be included in the city model, which ensures that the model can be used as a visual archive. When the city model is viewed along the timeline, the information models appear on a certain date (final inspection date) and they are initialled[6] into the image.

The city model will indicate which projects are under construction, and the final date can be used to view the project plans behind the information model. In practice, almost any kind of information[7] can be linked behind the information model, enabling the visualisation of data currently contained by registers. For example, by adding their own passwords, properties can use the information model as their own register to make the information required by the property managers directly available through this visual presentation.

In the future, it may be possible to implement map models in which buildings can be placed. The map model will include cable maps[8], and the owner can show the neighbours how the project actually looks. All interested parties can navigate the model virtually, see the model in street view or enter the building.

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[3] Many projects are under way, and the CityGML model is being prepared through the KIRA Digi project.
[4] XCITY DML format
[5] LOD5
[6] In this context, "initialling" refers to locking.
[7] In this context, "information" refers to information related to vehicle administration, taxation, services and housing companies, for example.
[8] electrical cables, sewers, building restrictions

One future concept is to gain information models on small residential houses and their neighbouring buildings. This has already been tested in Vantaa in the supplementary construction of areas consisting of these types of buildings. In 2017, the quality of the information model was not very high but, from the beginning of 2018, the photo walls will come from the image collections of the Pientaloteollisuus PTT ry association, which has provided 3D models of small residential buildings.

The scanned models that are currently in use are "dumb" models. If LOD3-level models[9] are prepared, window and door openings and accurate details can be included in the images. People can then add interior photos of their flats to them to make smart interior models available to all housing owners. The accuracy of scanning is also increasing constantly, enabling the creation of smart interior models.

Another functionality that will streamline building control processes in the future is the **IFC-based design model**. It can be positioned on a map so that model review software[10] can prepare simple calculations to determine floor areas, volumes and other basic information that is required.

Down the road, it will be necessary to consider what building regulations can be implemented for **automatic review**. The elimination of a separate building control process by the end of the 2020s would result in a lighter and more efficient operating model.

This and many other elements of electronic service access will facilitate the building permit process in the near future. Technological developments, the adoption of new operating methods and open attitudes towards new operating models will provide us with the opportunity to be global pioneers in customer-oriented cooperation across sector boundaries.

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[9] not from the side but scanned as photos
[10] Solibri Model Viewer is one of these model review tools.

Sources

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