



INSPIRE

Infrastructure for Spatial Information in Europe

## **Member State Report: Finland, 2010–2012**

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## **1 REQUESTS FOR INSPIRE REPORTING**

INSPIRE reporting concerns the execution and implementation of the INSPIRE Directive in EU Member States. The reporting has been laid down in a Directive and the Commission has issued a decision on monitoring and reporting (2009/442/EC). The monitoring data will be compiled and submitted to the Commission annually, and the reporting at three-yearly intervals. The reports from Member States shall describe the organisation and functions of the implementation, the use of the spatial data infrastructure and data sharing arrangements, as well as the resulting costs and benefits.

## **2 STRUCTURE OF THE REPORT**

For reporting, the EU Commission has provided a structure which is based on the Commission's decision on monitoring and reporting (2009/442/EC). The Commission will have the report translated into English.

### **3 EXECUTIVE SUMMARY**

The European INSPIRE Directive was adopted in 2007 and was implemented in Finland in 2009 by a law (421/2009) and a decree on the infrastructure for spatial data (725/2009, amended by 1282/2009). The implementation of the Directive and the execution of the infrastructure for spatial data have proceeded in a wide range during 2010–2012. The national contact party of the implementation was the Ministry of Agriculture and Forestry of Finland and the development of the national coordination structure has been guided and monitored by the National Council for Geographic Information created by the Finnish Government. All parties have had the opportunity to participate in the implementation of the infrastructure for spatial data and its monitoring in the open INSPIRE network, in which 350 experts from 120 organisations, administration, the business sector as well as teaching and research are involved. The INSPIRE secretariat in the National Land Survey of Finland has offered support and information services and training, as well as implementing the national geoportal, in co-operation with other parties.

In Finland, at least 75 national spatial data sets, together with material from municipalities, regional councils and other regional operators, have been recognised as falling under the scope of application of the INSPIRE Directive. The assignment of the authorities governing geographic information is to implement view and download services, include the metadata regarding materials and services in the national discovery service, publish the terms of use in the data network, and monitor the use of geographic information. The implementation has been phased in themes according to Annexes I, II and III of the Directive. In 2010–2012, the goal was to implement the infrastructure for spatial data in respect of materials belonging to the scope of Annexes I and II.

The implementation of the infrastructure for spatial data has proved to cover quite extensively the drafting of metadata and the implementation of search and view services (WMS, Web Map Service). However, regarding municipalities, only a small number (mainly larger cities) have carried out the tasks. The implementation of download services has been delayed, mainly due to the delay in receiving the Commission's instructions, and approximately half of the download services have been completed. The metadata of the materials pass the validation almost without exception. In the metadata of services, there are small shortcomings in the interface services. The challenge is that the versions of software used do not support all the demands of INSPIRE. These shortcomings do not impede the normal utilisation of the

services, which is also supported in Finland by continuous monitoring of the availability of interface services.

The INSPIRE network prepared a national spatial data strategy for 2010–2015. The strategy emphasises the extensive utilisation of the infrastructure for spatial data. Through the actions they have taken and events they have arranged, the working groups of the network have communicated and promoted the implementation of the strategy. The National Council for Geographic Information has monitored the implementation of the strategy. The strategy update has been initiated.

On 3 March 2011, the Finnish government gave a decision-in-principle on the sharing of public data. Map and location data were named as the pilot target. Environmental data has been open data since 2008, and the National Land Survey of Finland opened its terrain data on 1 May 2012, as a result of which the downloading of information has increased greatly in comparison to the former situation. Other authorities have also opened or prepared for the sharing of their spatial data sets for free re-use.

The interoperability of the public administration's data systems is the objective of the Finnish Information Management Act (634/2011), which entered into force in 2011. The Ministry of Finance coordinates the implementation of the interoperability which is the goal of the comprehensive total architectural work, reference architectures and references by public administration. On the basis of the INSPIRE architecture, the reference architecture of the public administration's spatial data has been developed.

The national geoportal, Paikkatietoikkuna (the 'Spatial Data Window') offers metadata browsing and a map interface, where a user may choose over 300 map layers for review. Users who has subscribed to the portal may also define and publish the map interface on their own website, if they so wish. The National Land Survey of Finland has made a web service agreement with 30 data suppliers, and the portal has over 10,000 registered users. The open-source portal is being further developed on the basis of the reference architecture of spatial data as a service platform which enables the publication of versatile map interfaces.

In 2012, the utilisation of the spatial data infrastructure was clearly more active than before. Altogether, approximately 475 million service requests were made to the view services (WMS), an increase over the previous year of approximately 70%. Over one million files were downloaded using the services by approximately 20,000 users in almost 100,000 downloading events.

Over 1.6 million service requests were made regarding the metadata of the discovery service. In Finland, spatial data sets are also widely used in other ways on the Internet and in the internal services of organisations.

In total, approximately EUR 4.9 million was invested in the implementation and development of the spatial data infrastructure during 2010–2012, of which the authorities' costs in the implementation of interface services and the preparation of metadata were approximately one million euro. Approximately EUR 2 million was used for coordination, support, training, harmonisation work and monitoring, and almost the same amount for the development of the geoportal.

Obstacles to the utilisation of spatial data have so far been, for example, inadequate know-how and a lack of clarity in the terms of use and in data protection issues. The use of spatial data and the adoption of new methods of operating require new skills in different fields. The utilisation of many sets is still being slowed down by unclear assignment practices and the terms of use. The protection of privacy may restrict the sharing of the information and the interpretations are not established.

The implementation of the INSPIRE Directive has speeded up the implementation and utilisation of the national spatial data infrastructure in Finland. The availability of spatial data has clearly improved and its use has increased. The sharing of public information has also concurrently supported the development. The increasing use of spatial data will lead in the long term to an improvement in the quality of information and the development of users' needs to better correspond to the data products.

#### **4 ABBREVIATIONS AND ACRONYMS**

INSPIRE	Directive 2007/2/EC
EC	The European Communities

#### **5 Introduction**

This report discusses the implementation of Directive 2007/2/EC of the European Parliament and of the Council establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) in Finland between 1 October 2010 and 31 December 2012. The preparation of this report is based on the



provisions of the Directive and the implementing rules and instructions given on the basis of it.

The report has been prepared in collaboration between the INSPIRE Secretariat and the Ministry of Agriculture and Forestry of Finland working as the contact party. The report was reviewed and approved by the National Council for Geographic Information on 14 May 2013.

The report is largely based on annually collected monitoring information about the implementation of the INSPIRE Directive, the metadata descriptions of spatial data sets and services in the discovery service, as well as the co-operation within the INSPIRE network and the secretariat's experiences in the implementation of the national geoportal.

In connection with the collection of monitoring information, an enquiry for the authorities administrating spatial data was carried out for the support of the reporting. Comments were given by 13 main data providers from the state government and by 25 municipalities, which have been mentioned in Annex 12.1.

The report is supplemented by a monitoring table of the implementation of the INSPIRE Directive to be submitted to the EU Commission annually.

## 6 Coordination and quality assurance

### 6.1 Coordination

#### 6.1.1 Contact party of Member State

##### Name and contact information

National contact party of Member State	
Name of the authority	Ministry of Agriculture and Forestry of Finland
Contact information:	
Postal address	PL 30, FI-00023 Valtioneuvosto, Finland
Telephone no.	+35829516001
Telefax no.	+358916054202
E-mail address	kirjaamo@mmm.fi
Website address (URL)	www.mmm.fi
Contact person	Antti Vertanen
Telephone no.	+358407204001
E-mail address	antti.vertanen@mmm.fi
Contact person - substitute	
Telephone no.	
E-mail address	

##### Role and responsibilities

The national contact party is the Ministry of Agriculture and Forestry of Finland (MMM), whose role as the contact party was laid down in the Act on Spatial Data Infrastructure. According to the policy of the Finnish Government, the Ministry's tasks include, among others, information society and data system matters in its own administrative sector, as well as the promotion of the sharing of spatial data. The Ministry has promoted and led the development of the sharing of spatial data for more than 25 years as well as leading the national cooperation and the National Council for Geographic Information, and been

responsible for the maintenance of the national spatial data strategy.

The national contact party:

- takes care of contacts with the European Commission and represents Member State in the meetings of the INSPIRE Committee;
- is liable for the preparation of the national legislation concerning the implementation of the INSPIRE Directive and for monitoring the implementation and use of the national spatial data infrastructure;
- finances and guides the implementation and provision of support services;
- supports the preparation of the public administration's recommendations aimed at the interoperability of spatial data and services;
- sees to the strategy work aimed at the development and utilisation of the spatial data infrastructure.

The Ministry of Agriculture and Forestry is also liable for the administrative target control of the National Land Survey of Finland, which takes care of the support services of the implementation.

### 6.1.2 Coordination structure

#### Name and contact information

<b>Coordination structure supporting the contact party</b>	
Name of the coordination structure	National Council for Geographic Information
Contact information:	
Postal address	c/o MMM, PL 30, FI-00023 Valtioneuvosto, Finland
Telephone no.	
Telefax no.	

E-mail address	
Website address (URL)	<a href="http://www.paikkatietoikkuna.fi/web/fi/paikkatietoasiain-neuvottelukunta">http://www.paikkatietoikkuna.fi/web/fi/paikkatietoasiain-neuvottelukunta</a>
Contact person	Antti Vertanen (Chair)
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Contact person - substitute	Antti Rainio (Secretary)
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E-mail address	antti.rainio@nls.fi
Term	1.3.2010–28.2.2013

### Role and responsibilities

The coordination structure supporting the national contact party is the National Council for Geographic Information set by the Finnish Government. Its term of office is three years. The tasks of the National Council for Geographic Information were laid down in the Decree on the Infrastructure for Spatial Data (725/2009).

The following parties are represented in the National Council for Geographic Information:

- Ministry of the Interior
- Ministry of Defence
- Ministry of Finance
- Ministry of Social Affairs and Health
- Ministry of Agriculture and Forestry
- Ministry of Transport and Communications
- Ministry of the Environment and
- Ministry of Employment and the Economy.

In addition, a maximum of eight members will be appointed to the National Council for Geographic Information, who shall represent:

- providers and users of spatial data and services;
- municipalities;
- research in the field and collaboration networks.

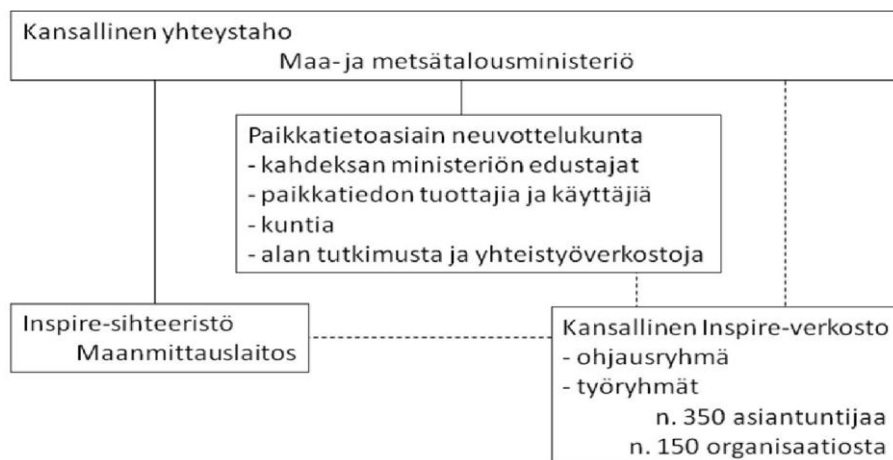
The National Land Survey of Finland takes care of the secretarial tasks of the National Council for Geographic Information, and experts from the Finnish Geodetic Institute and the Finnish Defence Forces have acted as permanent technical experts.

### INSPIRE Secretariat

The INSPIRE Secretariat operating in the National Land Survey of Finland is responsible for:

- discovery service
- advice and expert services
- the Internet site
- the tasks of the Secretariat of the National Council for Geographic Information
- the tasks of the Secretariat of the National Inspire Network.

### Organisational chart



[National contact party

Ministry of Agriculture and Forestry of Finland

National Council for Geographic Information

- representatives of eight ministries
- providers and users of spatial data
- municipalities

- research in the sector and cooperation networks

INSPIRE Secretariat

National Land Survey of Finland

National Inspire Network

- steering committee

- working groups

approx. 350 experts

from approx. 150 organisations]

15-May-13

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**Relations with third parties**

The relationship of the coordination structure with third parties is implemented through the National Council for Geographic Information and through the National Inspire Network. The Province of Åland is independently responsible for the implementation of the INSPIRE Directive on the basis of its autonomy. INSPIRE matters are discussed with neighbouring countries in the Nordic network (Nordic INSPIRE Network).

**National Inspire Network of Finland**

The National Inspire Network of Finland ([www.paikkatietoikkuna.fi/web/fi/inspire-verkosto](http://www.paikkatietoikkuna.fi/web/fi/inspire-verkosto)) was established on 1 June 2009. The network is open and free of charge to all parties. The collaboration is voluntary and the network involves over 350 experts from approximately 120 organisations. One third of the organisations are government institutions, one third are companies, one quarter are municipalities and the rest are mainly universities and vocational institutions. The aim of the network is to promote the implementation and utilisation of the national spatial data infrastructure as well as the implementation of the INSPIRE Directive.

**Connecting spatial data and services for the spatial data infrastructure**

All parties producing spatial data and services can describe their sets or services free of charge in the national discovery service, Geonetwork ([www.paikkatietohakemisto.fi](http://www.paikkatietohakemisto.fi)), implemented by the INSPIRE Secretariat and connect to the spatial data offered as viewing and downloading services to be browsed in the national geoportal, Paikkatietoikkuna ([www.paikkatietoikkuna.fi](http://www.paikkatietoikkuna.fi)).

**Overview of work methods and processes**

The Finnish Act on the Infrastructure for Spatial Information (421/2009) and the Finnish Decree on the Infrastructure for Spatial Information (725/2009, amended by 1282/2009) name parties and their tasks in the implementation of the INSPIRE Directive. The Province of Åland has, on the basis of its autonomy, adopted its own Act (85/2010) and Decree (86/2010) on the implementation of the Directive.

The tasks of the **National Council for Geographic Information** are to:

- 1) monitor the general development of the national spatial data infrastructure;
- 2) monitor the implementation of the measures of the Act on the Infrastructure for Spatial Data on the basis of monitoring information and to take measures to remedy shortcomings if necessary;

- 3) review statements and proposals relating to the implementation of the spatial data infrastructure by the EU Commission;
- 4) process national rules of application, if any, relating to the implementation of the spatial data infrastructure;
- 5) review any terms of use and limitations of the spatial data infrastructure presented by the National Land Survey of Finland in relation with the use of general network services;
- 6) make proposals and give statements on matters concerning the development of the spatial data sector.

The National Council for Geographic Information convenes four times a year. The National Council for Geographic Information has adopted the annually applicable National Inspire Material List, and the INSPIRE Monitoring Information and the INSPIRE Reporting to be submitted to the Commission.

**The National Inspire Network of Finland** maintains the national spatial data strategy in cooperation with the Ministry of Agriculture and Forestry of Finland and the National Council for Geographic Information. The network contributes to the implementation of the strategy and the possibilities of all parties to benefit from the development of the ecosystem of spatial data. The network acts as a forum for exchanging information and experiences relating to the implementation and utilisation of the spatial data infrastructure.

The network has adopted the plan for the following operating year in each of their annual meetings and chosen the steering group to lead operations, which consists of a chair, vice-chair and leaders of working groups. The network has functioned as five working groups:

- infrastructure
- cooperation
- utilisation
- know-how
- architecture

In addition, in connection with the network, a Terminology and Ontologies project has been carried out.



The tasks of the INSPIRE Secretariat in the National Land Survey of Finland are to take care of the discovery service and the implementation support services, as well as the Internet site. The support services include the information service concerning the interpretation of regulations and technical questions, as well as advice on the terms of use and agreement models. The INSPIRE Secretariat publishes reviews relating to the implementation of the Directive, arranges training events and seminars, and develops and maintains the national geoportal as a service platform supporting the utilisation of the infrastructure.

Altogether, approximately 400 experts from approximately 80 organisations, the state government, municipalities and companies have participated in training organised by the INSPIRE Secretariat.

**The authorities governing spatial data** are obligated by the Finnish Act and Decree on the Infrastructure for Spatial Data to take the following actions regarding data sets and services within the framework of the Directive:

- create descriptions with metadata on the national discovery service
- publish the terms of use on the data network
- implement the view and download services
- monitor their use.

The scope of application of the INSPIRE Directive is extensive, and in Finland it concerns approximately 20 national authorities, as well as municipalities and regional councils and certain authorities of regional governments. In connection with the drafting of the national law concerning the spatial data infrastructure in 2008, there was a preliminary clarification of which spatial data sets fall within the scope of application and which authorities are responsible for them. Upon the completion of the implementing rule concerning the interoperability of spatial data, a working group of the main authorities was established for each theme (Annex I of the Directive, spatial data groups), the purpose of which was to prepare a plan for offering harmonised spatial data in said theme. These plans include which authority or authorities are responsible for producing said data product and what the timetable for the implementation is. Corresponding working groups have started, upon the supplementation of the aforementioned implementing rule, with determination of data products concerning new themes (Annexes II & III of the Directive). Due to the large number of themes, they were combined into seven groups. The aim of the working groups is to have the plans ready during 2013. The INSPIRE Secretariat supports the working of the groups and the National Council for Geographic

Information monitors the work.

**The international standardisation work** produces and updates the standards promoting the interoperability of spatial data. ISO/TC211 and OGC are participating in the work, and an open and free of charge monitoring group (SFS/SR304) has been established in connection with the national standards union for monitoring the work.

**The Ministry of Finance of Finland** guides and coordinates, pursuant to the Information Administration Act (634/2011), the development and total architecture work of the public administration's data systems and their interoperability. To support the work, the INSPIRE Secretariat and the Architecture group of the INSPIRE Network have prepared a reference architecture for the public administration's spatial data which is based on the INSPIRE Architecture and expands it.

The Ministry of Finance will compile instructions on the development of interoperability in the Interoperability Portal.

**The Advisory Committee on Information Management in Public Administration (JUHTA)** is responsible, under the management of the Ministry of Finance, for the preparation and publication of the recommendations for the public administration (the JHS recommendations) aimed at the interoperability of data systems. In order to prepare and update recommendations concerning the interoperability of spatial data and services, working groups will be established when necessary whose work will be guided and supported by the JHS Group for Spatial Data. The group is open to parties interested in the drafting of recommendations and representatives of the state government, municipalities and companies have participated in it.

### **6.1.3 Comments on the monitoring and reporting process**

The tasks of the INSPIRE Secretariat operating in the National Land Survey of Finland are to compile annual monitoring data concerning the spatial data infrastructure and to prepare a summary for the Ministry of Agriculture and Forestry and the National Council for Geographic Information.

The summary of spatial data and services within the framework of the Directive contains information on:

- 1) the extent and interoperability of metadata;
- 2) the availability of metadata in the discovery service;
- 3) the geographic scope of spatial data sets;
- 4) the availability of spatial data sets on the data network and their interoperability;



- 5) the use of spatial data materials and the interoperability of services relating to them;
- 6) the terms and conditions as well as fees concerning the availability and use of spatial data and services;
- 7) the limitations of public availability and reasons for the limitations.

The National Council for Geographic Information will annually revise the national list of material within the framework of the INSPIRE Directive prepared by the INSPIRE Secretariat. The duty of the authorities governing spatial data is to interpret regulations concerning the implementation of the Directive and make, when necessary, proposals for the amendment of the material list. Upon the specification of the scope of application of the Directive along with the preparation of the data product specifications, amendments have been made annually to the national material list.

In order to collect monitoring information, the INSPIRE Secretariat will annually send a table pre-filled with the help of the metadata and the monitoring information from the previous year to the authorities governing spatial data. The authority will check and supplement the information and submit the table to the Secretariat, which will compile the information, enter it where necessary into the table given for the submission of the monitoring information, and submit the table to the Ministry of Agriculture and Forestry.

The National Council for Geographic Information will familiarise itself, with the help of the monitoring information and the prepared summary, with the development of the implementation and utilisation of the spatial data infrastructure and approve the monitoring table to be submitted to the EU Commission.

At three-year intervals and on the basis of the monitoring information, the INSPIRE Secretariat will produce, in collaboration with the Ministry of Agriculture and Forestry, a draft Member State report on the implementation of the INSPIRE Directive. The National Council for Geographic Information and the National Inspire Network will comment on the draft report, which will be completed by the Secretariat and the contact party on the basis of the comments, and submit it to the EU Commission.

## **6.2 Quality assurance**

### **6.2.1 Quality assurance processes**

The authorities governing spatial data will make sure that the metadata of spatial data and services is prepared and the services are implemented. The duties of the authority have been laid down in the Act and

the Decree on Infrastructure for Spatial Data and summarised in the recommendations for public administration (the JHS recommendations) published by the Advisory Committee on Information Management in Public Administration (JUHTA). The recommendations have been updated according to the publication of new implementing rules and instructions. The INSPIRE Secretariat will arrange training relating to the duties for the authorities. Training material and guidance are available on the national geoportal, Paikkatietoikkuna ([www.paikkatietoikkuna.fi](http://www.paikkatietoikkuna.fi)). In addition, the Secretariat will advise the authority where necessary.

The authorities will prepare the metadata concerning their data sets and services with the help of the user interface of the discovery service ([www.paikkatietohakemisto.fi](http://www.paikkatietohakemisto.fi)) provided by the INSPIRE Secretariat. The Secretariat has drafted completed description templates to facilitate the work. Alternatively, the authority will deliver the metadata to the discovery service as an XML file according to the standard. The INSPIRE Secretariat will inspect the metadata upon their publication. When inspecting the metadata, the reports of the validation tools provided by the EU Commission will be used. The INSPIRE Secretariat will remedy observed shortcomings or instruct the authority to remedy shortcomings.

The authorities will be responsible for the implementation of the viewing and downloading services. Mainly, the authorities allow the connection of the services to the national geoportal, with the help of which the INSPIRE Secretariat tests the functionality of the services. Upon the connection, the INSPIRE Secretariat will test the operation and interoperability of the services. When validating the services, the reports of the validation tools provided by the EU Commission will be used. The INSPIRE Secretariat will inform the authority, and often the company which delivered the software, of any observed shortcomings.

The accessibility of the services connected to the national portal will be monitored by the monitoring service ([www.spatineo.com/spatineo-monitor/](http://www.spatineo.com/spatineo-monitor/)), whose monitoring information is also shown as 'traffic lights' in the portal. The Secretariat has made an agreement on the service with a company providing monitoring services.

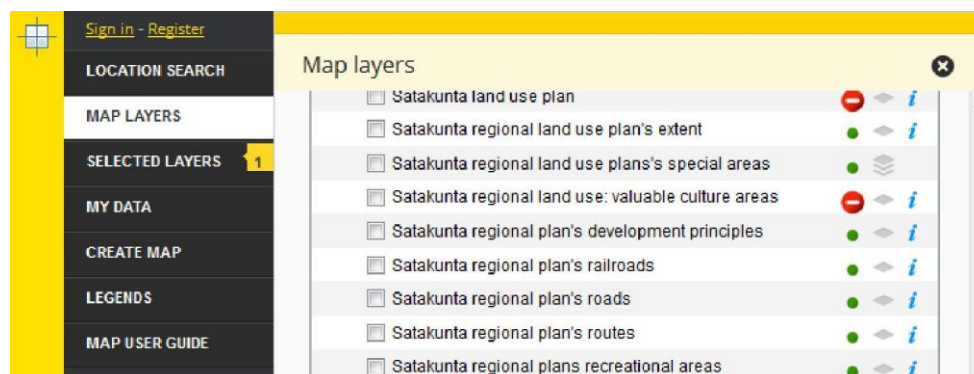


Figure 1: As the information illustrating the status of the infrastructure, the Paikkatietoikkuna displays the availability information of map layers based on continuous monitoring as ‘traffic lights’.

### 6.2.2 Analysis of quality assurance problems

Metadata has been prepared quite comprehensively. Shortcomings have been observed in the metadata which mainly result from a complex description manner (the ISO 19115 standard) and the shortcomings in the tool used for the preparation of the descriptions (GeoNetwork). The shortcomings in the metadata of the services reported by the validation are generally not in the metadata description; rather, they are in the service.

The discovery service contains a total of 347 metadata descriptions belonging to the scope of application of the INSPIRE Directive, of which 47 are service descriptions, 274 are dataset descriptions and 26 are series.

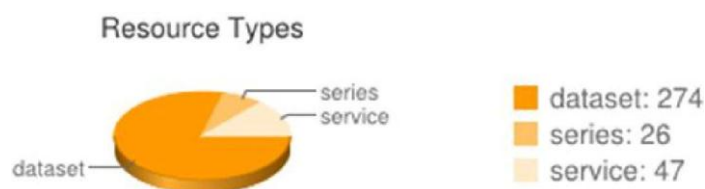


Figure 2: The resource types (series, dataset and services) correspond to the validated metadata descriptions.

### Metadata of spatial data

Of the metadata of series and datasets, 97% pass the Commission’s validation. Shortcomings in the metadata descriptions are generally small and easily fixed. The validation tool gives the warning ‘Passed with warning’ to a large part of set descriptions, which normally results from a missing or incorrect website address of the resource where further information about the set would be found. Metadata is obligatory for sets if such a webpage exists. However, the validation tool assumes that the page exists for all sets and gives the warning if the information is missing or the given address is not a functioning website address.

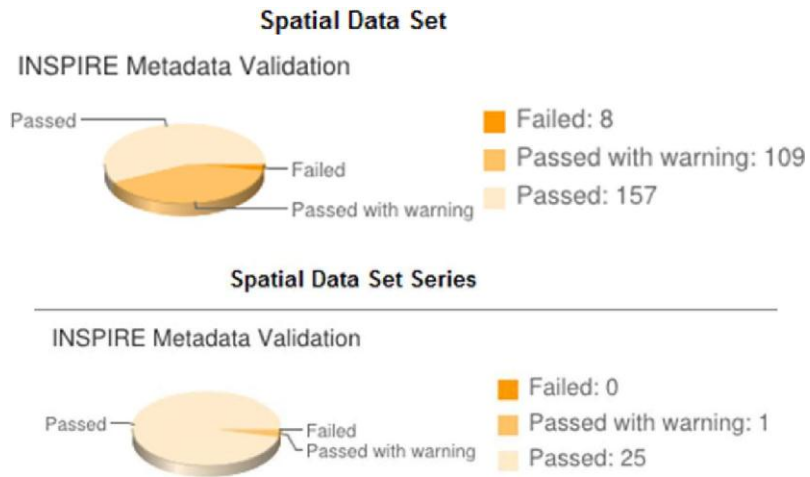


Figure 3: Validation information of the metadata descriptions of spatial data sets and data set series.

15-May-13

### Metadata of services and conformity

The view services required by the implementation of the INSPIRE Directive are quite comprehensively available, but only about half of the download services have been carried out. There are, altogether, 47 metadata descriptions of services, of which there are 30 viewing services, 15 downloading services, one transformation service and one discovery service.



Figure 4: The service types (discovery, view, download and transformation) correspond to the validated metadata descriptions.

The metadata of services in the discovery service are according to the requirements, even though 30 of them do not pass the validation, and for 16 services the report of the validation tool contains warnings. The shortcomings are not in the metadata, but the Commission's tool validates the services at the same time. The services are functional and according to the standard, but the service does not pass the validation if the metadata offered by the viewing or downloading service (the response to a GetCapabilities request) is defective in respect of the INSPIRE expansions. The expansion element required for the view services is only found in two services. The reason for the shortcomings is that the versions of the software used do not support INSPIRE expansions. The newest version of the software would probably support the feature, but the new version has not been taken into use yet. Other data missing in the view services are typically map layer-specific keywords and other elements. Services requiring authentication receive the 'Passed with warning' remark in the validation report.



Figure 5: Result of the validation of the services; shortcomings are not in the metadata descriptions of the services.



**The Discovery Service**, i.e. the CSW interface of the Geonetwork, is currently the only service that passes the Commission's validation when the GeoNetwork software in use has been tailored to suit the requirements in the Nordic cooperation project. The transformation service has not yet been validated.

**Shortcomings in the view and download services** observed in the implementation especially concern the special requirements written down in the implementing rules and guidance. A focal challenge for the implementation of the services and the achievement of interoperability within the given timetable has been the late completion of the technical instructions. Software supplying companies do not in practice have any possibilities to deliver software versions meeting the requirements to the clients in time. In respect of download services, the implementation of file services carried out as Atom feeds require diligence but achieving the requirements is possible. A precondition for the implementation of the query service is the support of the WFS 2.0 Standard which for now is only limitedly available in the software. Organisations that are only slightly familiarised with the spatial data technique have great challenges to adopt the details required for the implementation of the services so the software should support the requirements without a customer-specific tailoring.

### **Harmonised data products**

The provision of spatial data pursuant to the implementing services is so far scarce and the transition periods allow the implementation of the provision of the products later on. The authorities are forced to significantly invest in the adoption of the specifications of the data products in order to ensure interoperability.

Many defined INSPIRE data products are regarded to have a complex structure and be difficult to implement with the help of the currently used software.

### **6.2.3 Description of the measures taken to improve the quality assurance of the infrastructure**

The INSPIRE Secretariat offering support services has actively participated in the Initial Operational Capability Task Force (IOC-TF) group operating under the leadership of the Commission, where the technical instructions of the implementation have been developed and challenges and ambiguities in the application of the standards in practice have been brought forward.

The requirements concerning the implementation of the INSPIRE Directive have been communicated by letters and E-mails to the authorities to whom the requirements apply. The requirements have been summarised in the recommendations for the public administration published in Finnish and the matters are presented in Finnish and in Swedish on the geoportal. Authorities and companies serving them have been arranged training free of charge, and the material of the training is freely available on the geoportal. Advice free of charge is also available to everyone. Regulations and the technical instructions published by the Commission have been linked to the documents.

The INSPIRE Network has compiled a table where the support of different software products to the INSPIRE requirements is described. The table has been updated from time to time.

The INSPIRE Secretariat will inspect the metadata and interoperability of the services upon their publication.

The INSPIRE Secretariat will analyse the reports produced with the Commission's validation tool and it will inform the authorities and the companies of observed shortcomings.

The INSPIRE Secretariat has concluded an agreement with Spatineo Oy, a company specialised in the validation, on the continuous monitoring of the interface services of the spatial data infrastructure. The situational awareness picture is published as 'traffic lights' on the geoportal. The company offers monitoring and validation services directly to the authorities against payment.

### **6.2.4 Certification scheme**

The Commission's validation tool and Spatineo Oy's Monitor service are used for the quality assurance.

For now, no other certification schemes have been established.

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## **7 Contribution to the functioning and coordination of the infrastructure**

### **7.1 Overview of the implementation of the spatial data infrastructure**

The development of the sharing of spatial data was initiated in Finland in 1984 when the working group of the atlas sector proposed on the initiation of the national LIS project (LIS, Land Information System). As of 1980's, about twenty agencies, ministries, municipalities, companies and research units have participated in the collaboration. The geonetwork has existed in Finland as of 1987. The data transmission through messages was commenced in the beginning of the 1990's but the initiation of the international standardising ended the national development work. Only after the establishment of the INSPIRE Directive and the international standards have again triggered the implementation of the national spatial data infrastructure. Currently, there are approximately 10,000 users of licensed spatial data software in Finland.

The implementation of the INSPIRE Directive has proceeded quite extensively in Finland. The themes of Annexes I and II contain approximately 50 sets whose metadata and view services were implemented almost comprehensively by the deadlines (metadata on 1 December 2010, view services 11 May 2011). The implementation of the download services by the due date (28 June 2012) has been challenging, among others, due to the delay of the software, but the implementation has proceeded after that and approximately a half of the material belonging to the scope of application were available on the download service at the end of 2012. As regards the themes of Annex III, preparedness for the tasks required by the implementation has improved over years. In respect of municipalities, the implementation has faced challenges and the implementation has been delayed. By the end of 2012, 42 municipalities (in total approx. 3.2 million residents) had prepared metadata and the interface services of the view service had been implemented in 13 municipalities (in total approx. 1.8 million residents). As of 2012, municipalities have been given more support in the implementation than before.

The national geoportal, Paikkatietoikkuna, [www.paikkatietoikkuna.fi](http://www.paikkatietoikkuna.fi) was carried out as a pilot for the support of the implementation of the INSPIRE Directive in 2009. The production version of the portal published in the summer of 2010 was executed totally with an open source code and all new code versions have thereafter been freely available under double licence. The portal provides the metadata browsing and the map window where a user may choose over 300 map layers for review. A user who has subscribed to the portal may also define and publish the map interface on his or her own website, if he or she so wishes. The

National Land Survey of Finland acts as the operator of the portal and it has made a web service agreement with 30 data suppliers and the portal has over 10,000 registered users. A part of the suppliers allow the users with a free publication of their map layers. The portal is being further developed into a general service platform of spatial data which enables the publication of versatile map interfaces.

The Finnish national spatial data strategy, Location: the Unifying Factor, for 2010–2015 is oriented towards the utilisation of spatial data. The vision emphasises that the spatial data infrastructure generates growth, improves the quality of operations and generates new services. By relying upon a smooth-working data infrastructure, it is possible to build efficient administrative processes and competitive industries. Spatial data are also an important raw material for research and innovation and a basis for new companies that can develop their ideas into export products for growing international markets.

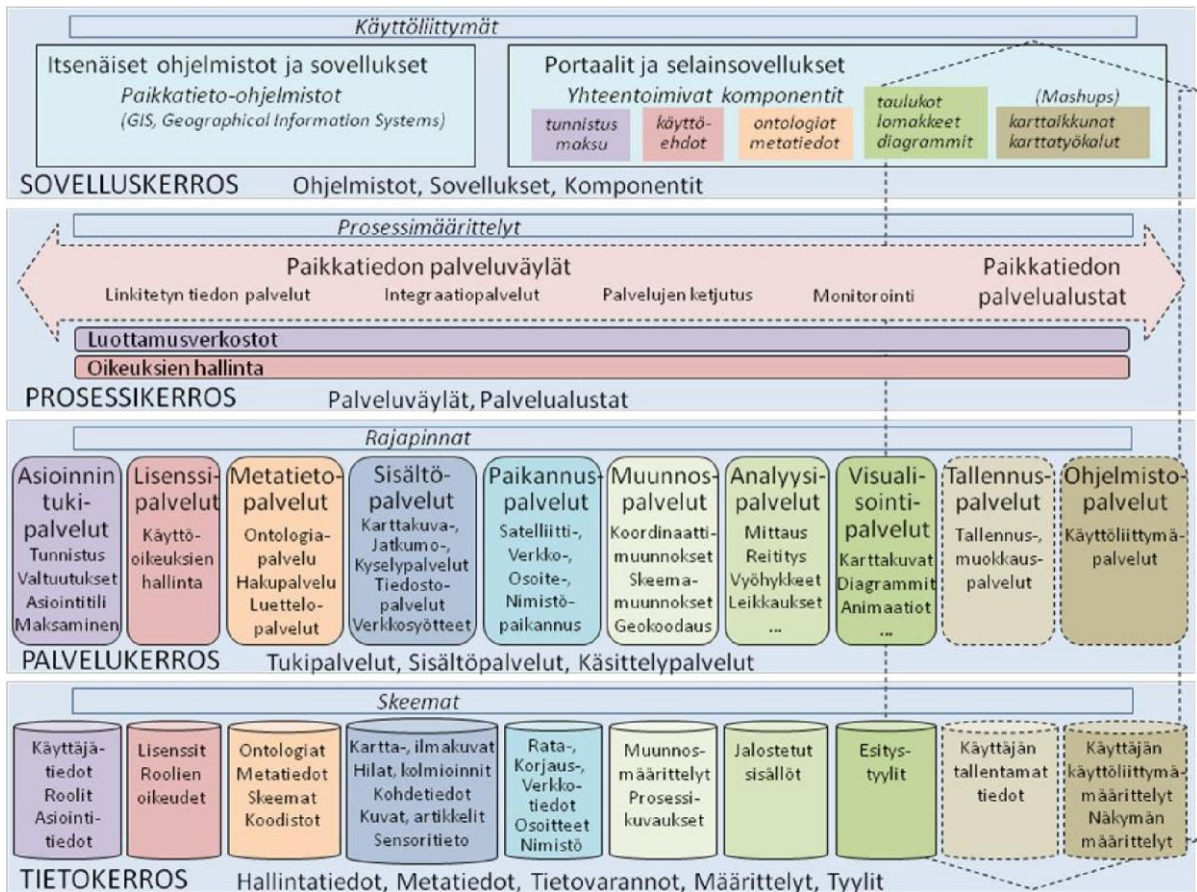
The updating of the national spatial data strategy has been initiated in the beginning of 2013.

The Finnish Government published on 3 March 2011 a decision-in-principle on the sharing of public data. In the decision-in-principle, map and location data were named as the pilot target. In respect of the environmental information, the transition to terms of use allowing free-of-charge and re-use was made already in the spring of 2008. The national information policy is being fully reformed and along with it the use of spatial data has significantly increased. The terrain information of the National Land Survey of Finland is available for re-use free of charge as of 1 May 2012. Many other spatial data sets have been opened and are opened, including weather observations and forecasts as well as climate information. The assignment of terrain information of the National Land Survey of Finland after the sharing of the data was by the end of 2012 more than 50 times that of the previous year!

The new Information Administration Act (634/2011) entered into force in Finland on 1 September 2011. The Act aims at interoperability of the public administration's data systems and especially that of the information of the basic registers and the terrain data. The main means are the total architecture work initiated in all administration units that is guided by the Ministry of Finland with the help of reference architectures and the public administration's standards.

The National Council for Geographic Information proposed on the preparation of the reference architecture of spatial data in the autumn of 2011. The INSPIRE Secretariat and the Network have produced a draft reference architecture that was published by the Ministry of Finance to be applied in the total architecture work.

The starting point of the **reference architecture of the public administration's spatial data** is the INSPIRE architecture that will be expanded where necessary. In the reference architecture of spatial data, analysis and visualisation services of spatial data functioning as interface services will be implemented alongside discovery, view and download services. The geoportal and other service platforms of spatial data will function as the software service (SaaS, Software as a Service) of the map interface application when the versatile utilisation of spatial data is possible by a browser as well. The specification and publication of the map user interface on a wished website are possible in 10 minutes. For the management of licences, services will be connected to trust networks where users are recognised in their home organisations on the single sign-on principle (SSO, Single Sign-On). The licences can be managed in a centralised manner with the help of the licence service. The vision is that the spatial data infrastructure with its services opens to a user on a browser as an extensive and versatile spatial data system. The service route described in the architecture will enable the specification, running and automation of the processes benefiting the entire infrastructure. The aim is that a process pursuant to the description prepared with architecture tools can be tested and activated immediately. Thus, the utilisation of spatial data will be clearly more fluent, simple and efficient for a user than before. In the future, with the help of the service route it could be also implemented integrations, such as the provision of spatial data as a linked data which requires for invariable identifiers of targets.



[User interfaces

Independent software and applications Spatial data software (GIS, Geographical Information Systems)	Portals and browser applications Compatible components																				
	<table border="1"> <tr> <td>recognition</td> <td>terms</td> <td>ontologies</td> <td>tables</td> <td>(Mashups)</td> </tr> <tr> <td>fee</td> <td>of</td> <td>metadata</td> <td>forms</td> <td>map</td> </tr> <tr> <td></td> <td>use</td> <td></td> <td>diagrams</td> <td>windows</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>map tools</td> </tr> </table>	recognition	terms	ontologies	tables	(Mashups)	fee	of	metadata	forms	map		use		diagrams	windows					map tools
recognition	terms	ontologies	tables	(Mashups)																	
fee	of	metadata	forms	map																	
	use		diagrams	windows																	
				map tools																	

APPLICATION LAYER Software, Applications, Components

Process determinations

Service routes of spatial data	Service platforms of spatial data				
<table border="1"> <tr> <td>Services of linked data</td> <td>Integration of services</td> <td>Linking of services</td> <td>Monitoring</td> </tr> </table>	Services of linked data	Integration of services	Linking of services	Monitoring	
Services of linked data	Integration of services	Linking of services	Monitoring		

Trust networks

Management of rights

PROCESS LAYER Service routes, Service platforms

Interfaces

Customer support services	Licence services	Metadata service	Content services	Positioning services	Transformation services	Analysis services	Visualisation services	Storage services	Software services
Identification	Management of licences	Ontology service	Map picture, Continuum, Query services	Satellite, Network, Address, Name positioning	Coordinate transformations	Measurement Routing Zones Sections	Map pictures Diagrams Animations	Storage and editing services	User interface services
Authorisations		Discovery service	File services						
Customer account		Index service	Network feeds						
Payment									

SERVICE LAYER Support services, Content services, Handling services

Schemas

User information	Licences	Ontologies	Map, orthophotos	Track, Repair, Network data	Transformation determinations	Refined contents	Presentation styles	Data saved by the user	Determinations of the User's interface
Roles	Role rights	Metadata Schema	Grids, triangulation	Addresses	Process descriptions				Determinations of the view
Customer information		Codes	Target information	Names					
			Pictures, articles						
			Sensor data						

DATA LAYER Administration data, Meta data, Data pools, Determinations, Styles]



Figure 6: The reference architecture of the public administration's spatial data aims at an infrastructure that offers users spatial data sets through role-based licences and the functionality of the spatial data system on the browser.

A main part of spatial data infrastructure is harmonised terms of use and functioning agreement models. A web service agreement has been prepared for the national geoportal in 2009 which has been signed by 30 spatial data suppliers with the National Land Survey of Finland.

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The agreement will be renewed in 2013 to the service agreement (draft) on spatial data infrastructure that enables the expansive utilisation of information and services through various service platforms and service routes. A significant part of infrastructure is open data and many interface services are widely available for utilisation.

The development of the spatial data infrastructure realises for its part the implementation of the Public Administration's ICT Strategy prepared under the leadership of the Ministry of Finance. For the implementation of the Public Administration's ICT Strategy, the Ministry of Finance has prepared, among others, the Open Data Programme. At the same time, the ICT 2015 working group has published the measure programme 21 Paths to Frictionless Finland, the implementation of which is led by the Prime Minister's Office.

## **7.2 Interest groups**

Various interest groups participate in the implementation of spatial data infrastructure, such as

- users of spatial data
- providers of spatial data
- service providers and
- coordinating bodies

### **Users of spatial data**

The users of data sets included in spatial data infrastructure are first of all the data providers. Essential users of spatial information are authorities in their various duties, such as

- monitoring of the state of the environment
- zoning and planning of land use
- planning and maintenance of transport networks
- municipal pipelines
- national defence
- the police and rescue tasks
- taxation and monitoring of businesses
- real estate tasks and surveys
- compilation of statistics

The use of spatial data is expanding to the administration's decision making and information management as

well as planning in social welfare and health care and organisation of training.

Spatial data produced by the authorities may also be beneficial to other parties in the administration and wider in the society. The authorities are customers to each other and the authorities have customers outside the administration. The users of spatial data are

- universities, institutes of higher education and universities of applied sciences with their research units and
- educational institutions where spatial data is becoming a part of learning environments.

Companies in many sectors utilise spatial data technology. Typical users of spatial data are companies whose line of business is

- mining
- forestry and forest industry
- energy supply
- planning of land use and construction
- management of the environment
- trade and logistics
- transport of goods and people
- data communications
- real estate brokerage

The utilisation of spatial data is expanding into many new sectors, such as finance and insurance business.

It is estimated that there are approximately 10,000 employees in Finland using the spatial data software in their profession.

**Providers of spatial data**

Spatial data is formed in a large part in the public administration's processes in order to take care of the task written down in the regulations or in its connection or in the connection of the business of companies or for that. The collection of the collective spatial data is increasing fast.

The providers of spatial data are

- Finnish Government
- regional government
- municipalities
- companies
- communities

In the state government, the largest part of agencies and institutions maintain spatial data sets for their own or other parties' operations. Only a part of these belonged to the scope of application of the INSPIRE Directive, i.e. approximately 20 organisations and in respect of them only a part of spatial data sets belonged to the scope of application. In some administrative sectors, such as in environmental administration and forest administration, the practical work in the collection and handling of spatial data is in significant parts on the regional administration level.

Municipalities are self-governing parties who have a plenty of statutory duties. Especially for land use planning, zoning and construction, and in some of their other duties, the municipalities produce spatial data sets. Only a part of the sets belongs to the scope of application of the Directive. The information produced by the municipalities is often collected to national data systems, such as cadastral data and construction data.

Companies collect spatial data for their own and for their clients' needs. Significant data providers are, for example, forest industry companies, telecommunications companies, energy companies and trade retail groups as well as consultants serving companies.

Data collection at the community level has long traditions in the observation of the species range. GPS devices and smart phones enable the operation of new entities producing spatial data, such as OpenStreetMap or Foursquare.

**Service providers**

The implementation and utilisation of spatial data infrastructure can be supported by various

services. Service providers are:

- internal and joint support service units of the administration
- companies

The Finnish Act and Decree on the Infrastructure for Spatial Data oblige the National Land Survey of Finland to provide support and guidance service relating to the implementation and utilisation of spatial data infrastructure. Many administrative sectors have joint information management service units and there are internal service units in large public administration organisations that assist various units in their duties.

Companies are essential service providers for the producers and users of spatial data. Companies

- supply spatial data software and provide support in their use
- offer services for the collection and distribution of spatial data
- handle the data collection and processing according to the assignment
- provide equipment and host services
- plan and materialise data systems according to the assignment
- produce and provide interaction services
- plan and test solutions

### **Coordinating bodies**

Coordinating bodies relating to the spatial data infrastructure are

- National Council for Geographic Information
- Advisory Committee on Information Management in Public Administration

The National Council for Geographic Information has the previously described statutory duties.

The Advisory Committee on Information Management in Public Administration gives, for example, recommendations for public administration (JHS recommendations) which aim at the interoperability of data systems. The JHS Division and Total Architecture Division operate in connection with the Committee.

The open INSPIRE Network supports and monitors the implementation of the INSPIRE Directive. The INSPIRE Network works in working groups as described below.

### **7.3 Role of interest groups**

The general steering of the public administration's information management belongs, according to the Finnish Information Administration Act, to the Ministry of Finance. The Ministry of Finance takes care, among others, of the total architecture work and the descriptions of interoperability. The Advisory Committee on Information Management in Public Administration (JUHTA) operates in connection with the Ministry of Finance. According to the Act on the Infrastructure for Spatial Data, the Ministry of Agriculture and Forestry of Finland steers and monitors the implementation of the Act, and the National Council for Geographic Information operates in its connection.

The providers of spatial data take care of the provision of common data to the users through view and download services. As a provider of the support service, the National Land Survey of Finland manages the discovery service (geonetwork) to which spatial data providers submit the metadata descriptions of their sets and services. The National Land Survey of Finland also takes care of the national geoportal (Paikkatietoikkuna) to which the data producers may connect their view and download services and with the help of which the users can browse metadata and available map layers and data products. The portal also functions as a service platform with the help of which users may publish on their own website map interfaces based on the spatial data infrastructure.

The providers of spatial data prepare their own metadata descriptions. The INSPIRE Secretariat trains and advises as well as reviews the result. The spatial data providers will realise the view and download services either independently or by ordering the implementation from a company. The provider may order the implementation as a service so that the service database with interface services is in the host service environment of the company. The technical knowledge of some authorities is profound; some are fully dependent on the knowledge of companies serving them. The INSPIRE Secretariat trains and advises parties in the application of regulations and instructions. In the INSPIRE Network, the parties share their experiences and tell of their solutions in the management of INSPIRE liabilities.

The JHS Group of the Spatial Data operates under the Advisory Committee on Information Management in Public Administration and it recognises the needs to prepare and maintain recommendations for public administration in order to promote the interoperability of spatial data. There are representatives of the state government, municipalities and companies in the open group.

The spatial data group of municipalities operates in connection with the Association of Finnish Local and Regional Authorities and it considers the role of municipalities in the supply of the information and services of spatial data infrastructure. The Ministry of Finance has financed the projects of municipalities and companies in order to develop the interface services of spatial data.

The INSPIRE Secretariat has together with the INSPIRE Network and the data providers developed and taken into use a network service agreement which records the parties' liabilities and responsibilities as well as the users' rights when view and download services are connected to the geoportal.

#### **7.4 Measures implemented to facilitate the data sharing**

The spatial data infrastructure is implemented when the authorities take care of the implementation of view and download services and the preparation of the metadata descriptions of sets and services in the discovery service.

In addition, for example, in the following projects and services have been invested in Finland:

- Finnish National Spatial Data Strategy
- The national geoportal, Paikkatietoikkuna
  - metadata widget
  - service platform of spatial data – publication of map interface
  - Oskari software with open source code
- Sharing of public information
  - download service of environmental data - Oiva
  - sharing and download service of terrain information
  - other sharing of spatial data

- Helsinki Region Infoshare project
- National Apps4Finland - Maps4Finland competition
- SADe software of electronic services
- PaikkaOppi
- Paituli spatial data service
- Lounaispaikka
- Kunnan rakennetun ympäristön sähköisten palvelujen kehittäminen – Krysp (‘Development project for electronic services in built environments’)

As a result of projects and especially concrete services utilising spatial data infrastructure, the motivation of data providers to implement view and download services has increased. Through the services, the development of infrastructure is changing from supply-based into demand-based. The development may change the operations so that the needs of customers and cases start to guide the supply, bring forward quality shortcomings of the existing spatial data and finally steer for its part the data collection.

Continuously available electronic services require that the service ability of interface services is good and possible interruptions in use remain short. Especially well operating view and download services are developed when the data provider changes its operations so that its own process also utilises the created interface service and the service is not only a separate function supporting external customers.

### **Finnish National Spatial Data Strategy**

The valid national spatial data strategy has been updated and published in 2010. The implementation of spatial data infrastructure is the starting point that aims at the expansive utilisation of spatial data in the society. Cooperation and the clarification of parties’ roles enhance the targets. Increasing the training and knowledge related to spatial data as well as research form a precondition for the growth in the utilisation of spatial data infrastructure. A plan on the implementation of the strategy in various administrative sectors has been prepared between main ministries. The update of the strategy was initiated in the beginning of 2013.

### **The national geoportal, Paikkatietoikkuna**

The national geoportal, Paikkatietoikkuna ([www.paikkatietoikkuna.fi](http://www.paikkatietoikkuna.fi)) introduces the spatial data infrastructure and its possibilities. With the help of the portal, it is easy to familiarise with spatial data and services offered by the infrastructure. Their metadata can be browsed in the service but also publish on other websites through the provided widget. On the Paikkatietoikkuna, it is possible to browse available map



layers transparent and on top of each other if necessary and compare the suitability of various sets to the needs of the user. A user can register as a user of the service after which it is possible to save views containing different map layers and the user's own targets on the user's own map layers. There were about 10,000 registered users at the end of 2012.

Users who have subscribed to the portal may also define and publish map interfaces on their own website. New functions are being developed to the service, such as the presentation of statistics information as theme maps and focal spatial data analyses. The Paikkatietoikkuna is being developed by utilising the open source code libraries and the results of the development work will be published as an open source. The party responsible for the development of the portal in the National Land Survey of Finland is the INSPIRE Secretariat who has through a public bidding formed a development team out of programmers of six companies. The development work is proceeding with the help of Scrum methods of agile software development. Parallel projects have been installed alongside the project that for their part develop the service platform.

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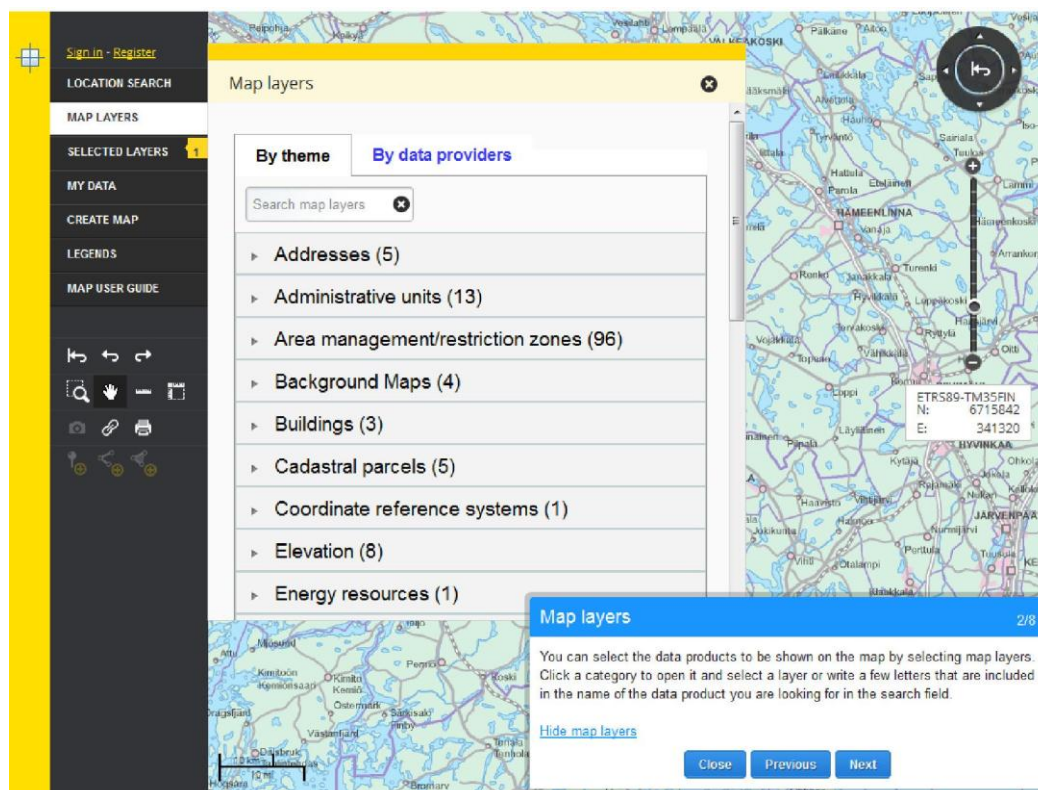


Figure 7. The national geoportals, Paikkatietoikkuna ([www.paikkatietoikkuna.fi](http://www.paikkatietoikkuna.fi)) offers a possibility to get acquainted with the contents and services of spatial data infrastructure. The Paikkatietoikkuna also functions as a service platform with the help of which users may publish a map layer on their own website.

### Sharing of public information

The sharing of public information is proceeding with the help of the government resolution and entries in the government programme. The Finnish Environment Institute opened environmental data for free re-use already in 2008 and is providing the material to be downloaded on its Oiva service ([www.ymparisto.fi/oiva](http://www.ymparisto.fi/oiva)). The National Land Survey of Finland has opened terrain data for free re-use on 1 May 2012 and it has published the open data download service ([www.maanmittauslaitos.fi/avoindata](http://www.maanmittauslaitos.fi/avoindata)). The Geological Survey of Finland, the National Board of Antiquities, the Finnish Forest Research Institute and the Statistics of Finland as well as the Meteorological Institute have opened their material. The sharing of spatial data is continuing and the development is being monitored on the Paikkatietoikkuna ([www.paikkatietoikkuna.fi/web/fi/avoin-paikkatieto](http://www.paikkatietoikkuna.fi/web/fi/avoin-paikkatieto)). Municipalities have also started to open their material. The municipalities in the region of Helsinki have initiated in 2010 the Helsinki Region Infoshare project ([www.hri.fi](http://www.hri.fi)) in connection of which spatial data sets of the municipalities have been shared. The City of

Tampere has initiated a corresponding project in 2012. The annual Apps4Finland ([www.apps4finland.fi](http://www.apps4finland.fi)) competition was initiated in 2009. In 2011 and 2012, a special prize Maps4Finland was awarded which has made possibilities of free spatial data utilisation known. Over hundred competition works have been submitted to the competition during recent years and many of them contain spatial data.

### **SADe programme**

The Ministry of Finance initiated in 2009 the Action Programme on eServices and eDemocracy, SADe ([www.vm.fi/sade](http://www.vm.fi/sade)). The programme comprises many projects of which a part carries out services based on spatial data infrastructure. With the help of the permit services of construction ([www.lupapiste.fi](http://www.lupapiste.fi)), a user can fill in an electronic construction permit application with enclosed maps. The Harava ([www.eharava.fi](http://www.eharava.fi)) is a map-based query service which promotes the citizens' contribution opportunities in the planning of the environment. Liiteri will be a data and analysis service of land use that is based on maps and statistics. The SADe programme utilises and further develops the open source Oskari software.

### **PaikkaOppi**

The University of Turku has implemented the project PaikkaOppi ([www.paikkaoppi.fi](http://www.paikkaoppi.fi)), funded by the Finnish National Board of Education. It is a learning environment for spatial data aimed at upper secondary school that utilises the spatial data infrastructure. The learning environment provides online training packages and assignments in the field of geography.

By the summer of 2012, over 600 teachers from 300 schools or other institutes had registered with the learning environment.

### **Paituli spatial data service**

CSC, IT Center for Science, provides spatial data sets for the use of research and teaching of the Finnish academic institutions. Paituli (<http://www.csc.fi/tutkimus/alat/geotieteeet/paikkatieto/paituli>) is a download service and the metadata of sets are also found on its site. CSC has concluded agreements on the use of national sets and the sets of the National Land Survey of Finland, the Geological Survey of Finland, the Finnish Meteorological Institute, the Finnish Transport Agency, the National Board of Antiquities, the Agency for Rural Affairs, Statistics of Finland and the environmental administration can be downloaded from the service. In 2012, the service had over 1,700 users from 29 academic institutions.

Alongside with Paituli, the Spatial Data Lending Facility ([www.paikkatietolainaamo.fi](http://www.paikkatietolainaamo.fi)) created by the University of Turku in 2003 has been in use. It has offered for loan, free of charge, sets of many data providers, mainly from restricted test areas. The creation of Paituli and the sharing of public data have reduced the use of and need for the lending service maintained by the National Land Survey of Finland.

### **Lounaispaikka**

Lounaispaikka is a joint network project functioning under the Regional Council of Southwest Finland that was initiated in 2002. It has published a regional geoportal with the same name ([www.lounaispaikka.fi](http://www.lounaispaikka.fi)). The portal compiles spatial data sets produced by municipalities and other parties in the area into a compatible entity with their metadata and view services. As of 2012, the operation has been established and Lounaispaikka also functions as the service centre of regional councils taking care of the provision of sets belonging to the scope of the INSPIRE Directive in its view and download services.

### **Krysp project**

The Ministry of Finance has funded the municipalities' Krysp joint project, which defines the interface services and data products required for the electronic services of the built environment of municipalities (KRYSP) ([www.paikkatietopalvelu.fi](http://www.paikkatietopalvelu.fi)). Companies providing services to the municipalities have also participated in the project. They have provided specifications for their own products for the use of the municipalities. The project also piloted the data service compiling the interface services of municipalities that would enable the downloading of spatial data provided dispersedly by different municipalities from one

service.

### **7.5 Cooperation of interest groups**

In order to further the spatial data infrastructure and its utilisation, work is done in several networks, which are for example:

- National Council for Geographic Information
- National Inspire Network of Finland
- INSPIRE data product working groups
- JHS group of the Spatial Data
- LYNET network
- Fiuginet, the Finnish University Network for Geoinformatics
- ProGIS
- Remote Sensing Club of Finland
- Nordic INSPIRE Network

The cooperation concerning the national geoportal has been described in section 7.4 above.

#### **National Council for Geographic Information**

The National Council for Geographic Information has during its three-year period monitored the implementation of the spatial data infrastructure and the INSPIRE Directive. The Council has confirmed annually the National Inspire Material List, and reviewed the monitoring information and reporting to be submitted to the Commission. The Council has promoted and monitored the implementation of the national spatial data strategy, initiated the update of the strategy and made a motion to prepare the public administration's spatial data reference architecture.

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**National Inspire Network of Finland**

The Inspire Network prepared in 2010 a national spatial data strategy and has by its action furthered its implementation. In the action plan, the groups of the network have been placed according to the four main goals of the strategy and the groups organise seminars and workshops concerning their themes. The **Infrastructure** Group has monitored the implementation of the view and download services and the development of the national geoportal. In the group, authorities have shared their experiences on technical solutions and challenges.

The **Cooperation** Group has searched for pain points of value chains and contemplated possible solutions to clarify the roles of the parties. The group has also focused on the change of operating models, such as data sharing and development of an open source code.

The **Utilisation** Group has promoted the development of the maturity model of the use of spatial data and recognised best practices in the field as well as prepared a case directory introducing them. The group has also familiarised itself especially with the opportunities of spatial data in the development of municipalities' operations.

The **Knowledge** Group has tried to describe skills and knowledge profiles required in the work assignments of the spatial data sector. The group has in cooperation with the University Network commenced the organisation of annual Geoinformatics Research Days.

The **Architecture** group was initiated to support the preparation of the spatial data reference architecture for the public administration's total architecture. In the group, the parties have also presented the total architecture of their own organisation.

The **Terminology and Ontologies** project has functioned in connection with the network and taken care of the supplementation of the national glossary by terms relating to the implementation of the Directive as well as of the ontologisation and connection of the Vocabulary of Geoinformatics and the key vocabulary used in the metadata description to the general Finnish ontology.

**Data product groups**

The implementation of the INSPIRE Directive requires within the seven-year transition period to provide spatial data in a harmonised, compatible form in Europe. The Commission Regulation (EU) on the interoperability of spatial data records target types belonging to different themes, their characteristics and jointly applied code lists.

In Finland, the data product groups pursuant to Annex I of the Directive comprising spatial data providers were appointed in 2010 to plan for future data provision. Plans were published at the end of 2010. A

corresponding work is continuing in respect of themes under Annexes II and III of the Directive as in August seven groups started.

*Group: Themes*

*LEADER ORGANISATION and other PARTIES (more parties have joined the groups)*

Group 1: Elevation, Orthoimagery

MML, LIVI, PV, SYKE, Vantaa

Group 2: Land cover, Land use, Area management and restrictions, Natural risk zones

SYKE, LIVI, MML, MAVI, TEM, TUKES, the Regional Council of Southwest Finland, Helsinki

Group 3: Geology, Soil, Energy resources, Mineral resources

GTK, MML, MTT, SYKE, TUKES

Group 4: Statistical units, Population distribution, Human health and safety TK,

THL

Group 5: Buildings, Public utilities, Production and industrial facilities, Agricultural and aquaculture facilities

VRK, MML, TK, Espoo, Helsinki

Group 6: Environmental monitoring facilities, Atmosphere and climate, Oceanographic geographical features, Sea regions IL, HELCOM, SYKE, Uusimaa Regional Council

Group 7: Bio-geographical regions, Habitats and biotopes, Species distribution LTKM,

HELCOM, RKTL, the Finnish Forestry Centre, SYKE, Tapio

The aim is to complete the plans during 2013. Spatial data sets and their operators within the framework of the Directive are recognised during the work. The contents of the material are compared to the structure of the INSPIRE data product and the work division, compilation of the data product and the provision of services are agreed between the authorities. The work results of the groups have caused adjustments to the national list of INSPIRE sets and they are reflected in the contents of the national spatial data infrastructure to the extent when information and authorities belonging to the scope of application are named.

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The production of unchanging specifying identifiers regarding such data sets which do not previously have a corresponding practice and defined life cycle rules for different target types is considered a special challenge in the provision of harmonised data products.

### **JHS group of spatial data**

The Advisory Committee on Information Management in Public Administration has encouraged the creation of sectoral networks in order to prepare recommendations for public administration. The JHS group of spatial data comprising representatives of the state government, municipalities and companies has operated since 2008. The group has recognised needs for the submission and update of recommendations on the basis of the implementing rules and instructions of the INSPIRE Directive. The aim is that the most essential content of liabilities and clear instructions are available to the authorities and companies serving them.

Due to the INSPIRE requirements, the JHS system has provided or updated several recommendations which concern coordinate systems, metadata of spatial data, modelling, content services and data product specifications. Recommendations will be updated or prepared further, among others, to supplement the modelling of spatial data, to describe quality, for the support of the determination of their unique resource identifiers and life cycle rules and to determinate national data products as well as to apply code lists.

### **LYNET Network**

The LYNET Network is a coalition of natural resource and environmental research aiming at green growth, where the Finnish Food Safety Authority, the Finnish Geodetic Institute, the Agrifood Research Finland, the Finnish Forest Research Institute, the Finnish Game and Fisheries Research Institute and the Finnish Environment Institute are involved. The Network has numerous projects ongoing under four research programmes:

- Climate change programme
- Baltic Sea programme
- Bioresources programme
- Sustainable Land Use programme

The Network has extensive cooperation with universities and over 30 joint professorships with various universities.

### **Fiuginet, the Finnish University Network for Geoinformatics**

Fiuginet functions as a university network of research, teaching and communication relating to spatial data.



The purpose is to develop and support the research and teaching of geoinformatics, for example, in the supply and distribution of spatial data sets and software. Further collaboration subjects are the researcher education, joint research projects and development of international networks. The network promotes the interaction between sciences and acts as a communicator of the sector in the universities and the society. In the spring of 2012, the INSPIRE Network and Fiuginet started the organisation of annual Geoinformatics research days.

### **ProGIS**

ProGIS is an organisation that promotes the use of spatial data and spatial data technology in various sectors and provides a collaboration forum for the spatial data sector. ProGIS has individuals and organisations as members. The member organisations form a corporate ring that functions inside ProGIS. ProGIS organises two seminars annually and grants honorary mentions and awards.

### **Remote Sensing Club of Finland**

The Remote Sensing Club of Finland supports the information exchange between member organisations and member individuals with remote sensing and image processing interests. The club organises Remote Sensing Days annually as an independent event or in connection with some other event.

### **Nordic INSPIRE Network**

National contact parties and parties responsible for support services in the Nordic Countries convene twice a year to exchange experiences in the implementation of the INSPIRE Directive. The Nordic map facilities have initiated the NOSIN (Nordic Open Source Initiative Network) cooperation supporting the implementation of national spatial data infrastructure that produces common solutions with an open source code. For example, the GeoNetwork software used in the discovery service has been developed in cooperation. The Nordic map facilities have also participated in the ESDIN (European Spatial Data Infrastructure) project funded by the EU and they will participate in the ELF (European Location Framework) project beginning in 2013.

**7.6 Access to services through the INSPIRE geoportal**

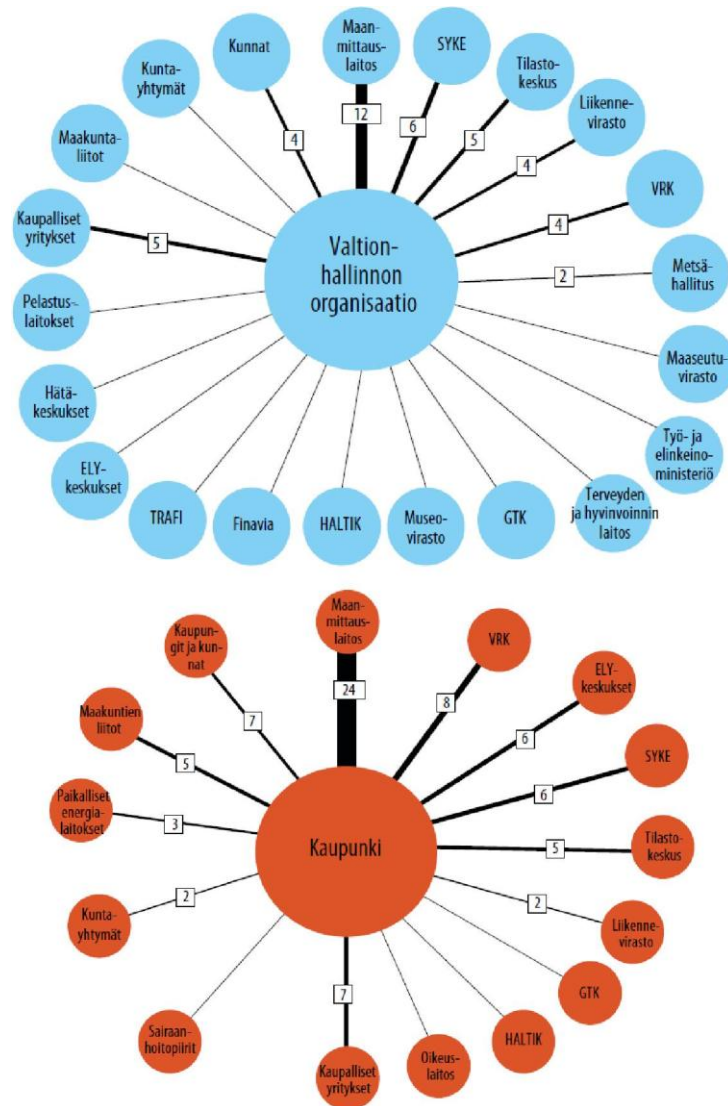
With the help of the INSPIRE Geoportal (<http://inspire-geoportal.ec.europa.eu/discovery/>) published by the EU Commission, it is possible to browse metadata of spatial data sets and services within the framework of the Directive. Metadata is available from 300 sets and 47 services. In the view service of the portal, it is possible to browse map layers available in the spatial data infrastructure. Regarding Finland, 316 have been enclosed and a part of them requires authentication. More metadata descriptions will be provided as the data providers prepare them. Upon the increase in metadata, the number of available map layers increases.

## **8 Use of the spatial data infrastructure**

### **8.1 Use of spatial data services**

The use of spatial data has increased in Finland during recent years especially due to the impact of the public data sharing and the implementation of the INSPIRE Directive. The development of the discovery, view and download services of the spatial data infrastructure has improved the accessibility to spatial data and the Directive has increased the public awareness. Spatial data is being utilised in many other ways as well.

The Utilisation Group of the INSPIRE Network published a clarification based on an extensive enquiry *Paikkatiedon hyödyntäminen Suomessa 2010, Osa 1 Julkishallinnon organisaatiot* ('Utilisation of spatial data in Finland 2010, Part 1 Organisations of Public Administration'). According to the enquiry, main providers of spatial data sets in public administration are, among others, the National Land Survey of Finland, the Finnish Environment Institute, the Centres for Economic Development, the Population Register Centre and the Statistics of Finland. On the other hand, the National Land Survey of Finland acquires a plenty of spatial data for its map production from municipalities and other authorities. Over 90% of the participants in the enquiry responded that there is a need to development spatial data knowledge in the organisation. The availability, quality, pricing and accessibility of sets as well as the usability of tools were informed to form the most significant obstacles of the utilisation.



[Organisation of the state government:

National Land Survey of Finland 12

Finnish Environment Institute (SYKE) 6

Statistics of Finland 5

Finnish Transport Agency 4

Finnish Population Register Centre (VRK) 4

Metsähallitus 2

Finnish Agency for Rural Affairs

Finnish Ministry of Employment and the Economy

Finnish National Institute for Health and Welfare

Geological Survey of Finland (GTK)

National Board of Antiquities  
ICT Agency HALTIK  
Finavia  
TRAFI, Finnish Transport Safety Agency  
ELY Centres (Centres for Economic Development, Transport and the Environment)  
Emergency centres  
Rescue departments  
Commercial enterprises 5  
Regional councils  
Municipal federations  
Municipalities 4

City:

National Land Survey of Finland 24  
Finnish Population Register Centre (VRK) 8  
ELY Centres (Centres for Economic Development, Transport and the Environment) 6  
Finnish Environment Institute (SYKE) 6  
Statistics of Finland 5  
Finnish Transport Agency 2  
Geological Survey of Finland (GTK)  
ICT Agency HALTIK  
Judicial system  
Commercial enterprises 7  
Hospital districts  
Municipal federations 2  
Local energy companies 3  
Regional councils 5  
Cities and municipalities 7]

Figure 8. According to the clarification, the authorities in the state government and in the municipalities typically obtain spatial data sets especially from the National Land Survey of Finland, the Finnish Environment Institute (SYKE), the Population Register Centre (VRK) and the Statistics of Finland (Source

of the image: *Paikkatiedon hyödyntäminen Suomessa 2010, Osa 1 Julkishallinnon organisaatiot*)

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The joint research project of the Research Institute of the Finnish Economy (ETLA), the Aalto University and Diges has resulted in the publication *Avoimen julkisen tiedon hyödyntämisen potentiaalista suomalaisissa yrityksissä* (Potential of the utilisation of open public data in Finnish companies). According to the report, companies utilise the free services of spatial data a lot. Companies providing added value service have ability and interest in also utilising the open spatial data of the public sector. The results of the report support the result of the research published by ETLA that especially the turnover of small and medium-sized enterprises (SMEs) grows approximately 15% faster in countries where spatial data has been opened compared to countries where the pricing of the public sector's data is high.

### **Interface services of spatial data infrastructure**

In connection with the implementation of the INSPIRE Directive, the monitoring data of the use of view and download services are collected annually. By the end of 2012, at least 25 view services (WMS, Web Map Service) belong to the spatial data infrastructure that were created by approximately 20 organisations and four query services (WFS, Web Feature Service) as well as four file services (ATOM feed).

### **Discovery service**

Altogether almost 1.7 million searches were made in the discovery service (CSW) of spatial data infrastructure in 2012. Service requests to the interface service are especially produced by the metadata interfaces of the Paikkatietoikkuna, the geonetwork service and set description websites published by some spatial data providers.

### **View services**

Altogether approximately 475 million service requests were made to the view services (WMS) belonging to the spatial data infrastructure of the authorities governing spatial data, whereas in the previous year the amount was approximately 275 million which means a growth of about 70% from the previous year. Partially the growth results from the new sets included in the view service during the year. The same spatial data sets are also widely used in other ways on the Internet and in the internal services of organisations. The amount of use of these services is not known.

In the following, the amount of service requests of the view service (WMS) by organisations:

- The service interface of the raster sets of the National Land Survey of Finland received

approximately 370 million service requests. The growth from the previous year is approximately 40%.

- The WMS services of the Finnish Environment Institute received almost 25 million service requests and the growth from the previous year is quadruple.
- The WMS service of the Finnish National Board of Antiquities received about 25 million requests and the growth is more than 60 times greater than in the previous year which is a signal of the commencement of a significant use.
- The WMS services of the City of Tampere received more than 20 million service requests and the services were not available in the previous year. The City of Tampere has published on its website map connections using WMS services.
- The WMS services of the Finnish Transport Agency received approximately 11 million requests which is more than three times that of the previous year. The proportion of the land transport is approximately 60% and the sea transport approximately 40%.
- The WMS service of the mine register map sets of the Finnish Safety and Chemicals Agency (TUKES) received approximately 7 million requests which relates to the publicity of mine matters in the media.
- The WMS service of the Geological Survey of Finland received over 6 million requests which is about 2.5 times the amount of the previous year.
- The WMS service of the Finnish Forest Research Institute received over 5 million requests during November and December. Opening of the service obtained coverage in the media which explains the amount of use.
- The WMS service of the City of Espoo received approximately 5 million requests.
- The WMS service of the land parcel register of the Finnish Agency for Rural Affairs received almost 3 million requests which is 50% more than in the previous year. A map interface operating on the browser is available for preparing agricultural subsidy applications.

### **Download services**

The implementation of the query service of the spatial data infrastructure is still incomplete but certain services have reached the production phase. Over 20 million queries were made query services (WFS) in 2012 whereas in 2011 there were about four million queries, so the query usage has increased five times. The amount of downloads exceeded the threshold of one million files in 2012. The key figures of monitoring download services are not very commensurate because the amount of downloaded data may essentially vary depending on the service and event.



In the following, the amount of service requests of the query service (WFS) in respect of certain services:

- Over 16 million queries were made on the WFS service of the mutual land information system of the National Land Survey of Finland and the municipalities, which is seven times the amount of the previous year.
- About 2.7 million queries were made on the query service of the terminology of the National Land Survey of Finland, resulting in a growth of 35%.
- 1.5 million queries were made on the WFS service of the construction data of the Finnish Population Register Centre, whereas only 1,000 queries were made in the previous year.
- 120,000 queries were made on the WFS service of the Geological Survey of Finland, constituting a growth of 20%.

The download services of the spatial data infrastructure have been developed and already some file services based on the ATOM feed have become available (the Geological Survey of Finland, Lounaispaikka, the National Land Survey of Finland, the Finnish Forest Research Institute, the National Board of Antiquities, the Finnish Environment Institute).

The expanding sharing of public data has increased the download amounts of spatial data really significantly. As of 1 May 2012, a large demand was directed at the open data of the National Land Survey of Finland and at the end of the year, almost 900,000 files had been downloaded which is several times the amount of previous years. From the Oiva service of the Finnish Environment Institute, 22,000 material packages were downloaded and the growth has been over 50% annually. Through the PaITuli service made for academic institutions, 156,000 files were downloaded, the growth being 14%.

Spatial data sets and open data are also available on the Internet through other channels. Their amount of use is not known.

### **Transformation service**

The coordinate transformation service (WPS/CT) provided by the Finnish Geodetic Institute is available as the transformation service of the spatial data infrastructure, on which 90,000 service requests were made during 2012.

## 8.2 Use of spatial data sets

The view services (WMS) of the spatial data infrastructure have already been widely taken into use and the use of the query service (WFS) is gradually expanding upon the transfer into new operation models and the increase of supply. The professional utilisation of spatial data is still currently dominated by file services regarding which there is a clear transfer into self-service. In connection with the implementation of the INSPIRE Directive, file services have been realised as Atom feeds where an easy map interface for the selection of files is provided in order to facilitate the use.

Spatial data is being obtained from many file services; some widely used are the following:

- The file service of open data by the National Land Survey of Finland
- The Oiva service by the Finnish Environment Institute
- The PaITuli spatial data service by the CSC, IT Center for Science

Hereinafter is further information about what information was mostly downloaded from the services.

Companies function as essential spatial data distributors for trade and industry and also for public administration. Examples of distribution channels are:

- Mapstream service by CGI (formerly Logica)
- Material and interface services by Karttakeskus
- AINO service and LOUHI service by SITO group

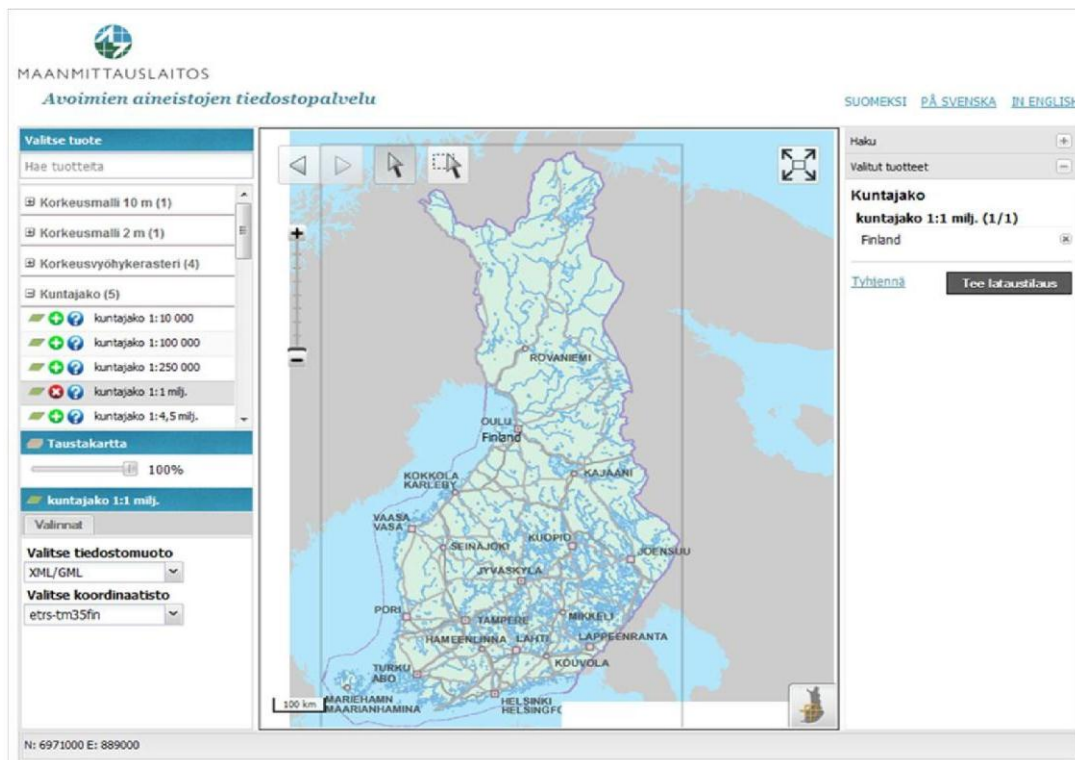
CGI's Mapstream service uses RaveGeo technology for the transmission of vector sets and through it, terrain, property and the Geological Survey of Finland's (GTK's) soil information as well as the sets of SYKE and the Statistics of Finland and data sets of NAVTEQ are available. Licences can be obtained online. Karttakeskus' set and interface services, map sets of different themes in vector and raster forms and data of many national and international service providers are transmitted through the service. The Lähde service of Karttakeskus provides WMS service.

The AINO service of the SITO group is an administration service of spatial data sets which provides data from different service providers in a manner that is interoperable with a customer's data system. In the LOUHI service, spatial data are compiled from various sources into one interface.

There are also many well-known map and set services of the administration in professional use, such as:

- Geo.fi service of the Geological Survey of Finland's (GTK's) geological maps and sets
- Land Information Service of the National Land Survey of Finland  
(former Ammattilaisen karttapaikka and KTJ browser information service)
- Metla's MetInfo forest information services
- The Finnish Transport Agency's road and street network Digiroad and the real-time traffic information Digitraffic, railway traffic Tasoristeys.fi and Primar nautical chart service of international nautical charts
- Lintuatlas and Kasviatlas of species range by the Finnish Museum of Natural History
- Kala-atlas of the Finnish Game and Fisheries Research Institute

The download and interface services of open spatial data has been presented on the Paikkatietoikkuna, <http://www.paikkatietoikkuna.fi/web/fi/avoin-paikkatieto>. An example of the utilisation of LiDAR (Light Detection and Ranging) material is the Karttapullautin application awarded in the Apps4Finland competition.



[National Land Survey of Finland

File service of open data

Search

Selected products

Select product	Municipal Division
Find products	Municipal division 1:1 M
Elevation model 10 m (1)	Finland
Elevation model 2 m (1)	Clear Make download order
Elevation zones raster (4)	
Municipal Division 1:10 000	
Municipal Division 1:100 000	
Municipal Division 1:250 000	
Municipal Division 1:1 M	
Municipal Division 1:4.5 M	
Background map	
Municipal Division 1:1 M	
Selection	
Select file form	
XML/GML	
Select coordinates	
etrs-tm35fin]	

Figure 9. In the file service of terrain data, an easy-to-use map interface has been created which has been built on the Atom feed.

**The download service of the National Land Survey of Finland** was initiated on 9 May 2012 and during 2012, the service obtained approximately 15,000 customers and almost 62,000 download events in connection with which about 900,000 files have been downloaded. The number of downloaded files concerning open terrain data:

- Basic map raster 191 399
- Elevation model 10 m 181 780
- Orthophoto in colour 168 140
- Topographic database (vector)120 881
- Laser scanning data 81 427
- Topographic map raster 1:50 00068 151
- Background map 1:5000 59 645
- Infra orthophoto in colour 46 437

- Background map 1:10 000 23 541

**The Oiva service of the Finnish Environment Institute** provides spatial data sets relating to hydrography, groundwater, nature conservation and land use. Downloading spatial data through the service has significantly increased during recent years. In 2010, about 9,000 set packages or partial sets were downloaded, in 2011 over 15,000 and in 2012 already over 22,000. The growth in the download of spatial data has in average been over 50% per year.

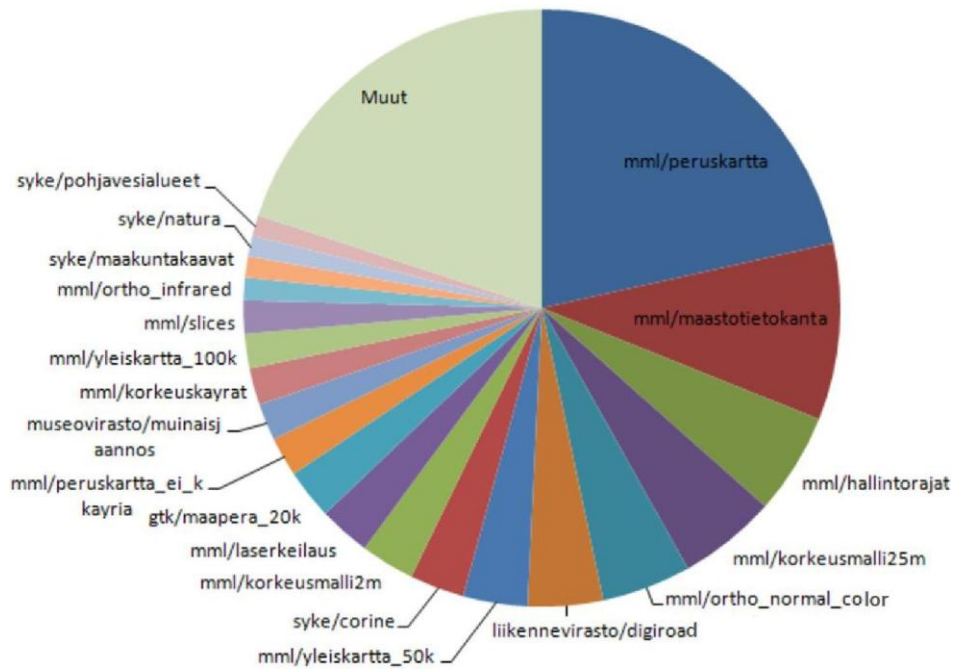
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The sets which were downloaded most from the Oiva service in 2012 were (the number of downloaded set packages):

• Groundwater bodies	1856
• Natura 2000	1533
• Nature conservation and wilderness areas	1364
• Catchment area division	1129
• Water bodies protected by the Finnish Rapids Protection Act	705
• Water management areas	605
• Restricted areas of terrain and water traffic	590
• Corine Land Cover 2006	578
• Forest vegetation zones	568
• Noise reports in accordance with the Directive on Environmental Noise	567
• Swamp vegetation zones	518

**The PaTuli spatial data service by CSC, IT Center for Science** is a set download service of universities and academic institutions that was commenced in 2009. In 2002, there were 1,700 users from 29 academic institutions and in 12,900 download times altogether 156,000 files were downloaded through the service mainly for teaching and thesis purposes. The use of the service has increased by 14% compared to the year 2011. Of the downloaded spatial data 68% was sets produced by the National Land Survey of Finland and approximately 15% was sets by the Finnish Environment Institute. Sets available in the service are free of charge for academic institutions and other parties using the service.



- [National Land Survey of Finland/basic map
- National Land Survey of Finland/topographic database
- National Land Survey of Finland/administration boundaries
- National Land Survey of Finland/elevation model 25 m
- National Land Survey of Finland/ortho\_normal-color
- Finnish Transport Agency/digiroad
- National Land Survey of Finland/general map\_50k
- Finnish Environment Institute (SYKE)/corine
- National Land Survey of Finland/elevation model 2 m
- National Land Survey of Finland/laser scanning
- Geological Survey of Finland/soil\_20k
- National Land Survey of Finland/basic map\_no\_k-curves
- National Board of Antiquities/relics
- National Land Survey of Finland/altitude contours
- National Land Survey of Finland/general map\_100k
- National Land Survey of Finland/slices
- National Land Survey of Finland/ortho\_infrared
- Finnish Environment Institute (SYKE)/regional plans

Finnish Environment Institute (SYKE)/natura  
Finnish Environment Institute (SYKE)/groundwater bodies  
Other]

Figure 10. In 2012, researchers, teachers and students of academic institutions downloaded over 150,000 files through CSC's PaITuli spatial data service, of which 68% was terrain information by the National Land Survey of Finland and about 15% was spatial data sets by the Finnish Environment Institute.

### **8.3 The public as the user of spatial data**

There are available many websites for the public through which the interface services of the spatial data infrastructure may be utilised. The same spatial data sets are also utilised in many map services of the Internet which are not based on the use of the interface services. Cities and other municipalities offer their residents many popular, traditional Web map services, such as municipalities' guide maps, base maps, orthophoto and zoning services as well as route guides and service maps.

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Metsähallitus (the Finnish Forestry Administration) offers the Retkikartta service for hikers. The Finnish Transport Agency offers the national Matka.fi route service.

Services utilising the interface services of the spatial data infrastructure are, among others:

- Paikkatietoikkuna
- Karttapaikka
- map interfaces of the City of Tampere
- Vipu service
- PaikkaOppi
- Suomi.fi Palvelukartta (service map)
- Kulttuuriperintö (cultural heritage)
- Mol.fi

**Paikkatietoikkuna** ([www.paikkatietoikkuna.fi](http://www.paikkatietoikkuna.fi)) is a national portal presenting the spatial data infrastructure which provides an easy-to-use map interface to the interface services of the infrastructure. The map window is daily used by over 1,000 different users and over 10,000 persons have registered as users in the service. Through the map window of Paikkatietoikkuna, over 40 million service requests were monthly made to the interface services of the spatial data infrastructure at the end of 2012; in addition, a significant part of the service requests of the map interface related to the cache service.

**Kansalaisen Karttapaikka** ([kansalaisen.karttapaikka.fi](http://kansalaisen.karttapaikka.fi)) has offered the public since 1996 the possibility to browse national terrain maps of the National Land Survey of Finland on the Internet as well as currently orthophotos and property boundaries. Karttapaikka resulted in the total of 135 million map searches in the interface services in 2012.

**The City of Tampere** has published on its website several map interfaces based on the view services (WMS) services. Service requests to the interface services amounted to over 20 million in 2012 – and the largest part of them when the public browsed the city's websites.

**PaikkaOppi** service ([www.paikkaoppi.fi](http://www.paikkaoppi.fi)) was made by the University of Turku in a project funded by the Finnish National Board of Education where a learning environment based on the interface services of the

spatial data infrastructure was developed and taken into use. PaikkaOppi service is used in over 200 secondary schools, mainly in connection with geography lessons.

**Palvelukartta** is a part of the Treasury's Suomi.fi portal ([www.suomi.fi/suomifi/suomi/palvelukartta](http://www.suomi.fi/suomifi/suomi/palvelukartta)). Palvelukartta of the Treasury's service points is based on view services. The portal has monthly about 150,000 specified users and in 2012 Palvelukartta resulted in 9 million map searches.

**The National Board of Antiquities** has published as a part of the services of the cultural environment data system a map interface based on the spatial data infrastructure which shows as map layers relics, heritage sites of built cultural environment and world heritage sites.

**Vipu service** ([www.mavi.fi/fi/index/viljelijatu/vipu.html](http://www.mavi.fi/fi/index/viljelijatu/vipu.html)) offers farmers an electronic service to fill out application forms for subsidies. In 2012, over 26,000 farms submitted their application on-line. A part of the service is the map interface which is based on the interface services of the spatial data infrastructure. Farmers can update their cultivation plans in the map interface which calculates the acreage information of drawings on the form.

**The Finnish Ministry of Employment and the Economy** is developing the search for open jobs and included in the new version of Mol.fi service a map interface based on the view service that shows the location of the job on the map.

The Action Programme on eServices and eDemocracy, SADe, developed services based on the spatial data infrastructure, such as the query service Harava ([www.harava.fi](http://www.harava.fi)) and the Lupapiste for building permits ([www.lupapiste.fi](http://www.lupapiste.fi)). There are also several other services under development which contain a map interface.

In Helsinki region, the following services providing interface services have been carried out:

- Helsingin seudun Reittiopas (route service of Helsinki region)
- Pääkaupunkiseudun palvelukartta (service map of Helsinki region)

**Reittiopas** ([www.reittiopas.fi](http://www.reittiopas.fi)) is a popular Internet service that provides the public transport routes also as a map interface. The service also offers an open route interface service on the basis of which many popular mobile applications to smart phones have been created.

**Pääkaupunkiseudun Palvelukartta** ([www.hel.fi/palvelukartta/](http://www.hel.fi/palvelukartta/)) is a mutual service carried out by municipalities which also provides an open Rest interface. Among others, several applications on mobile devices have been created on the basis of the interface.

#### 8.4 Cross-border use

Finland has a long sea border in the Baltic Sea region and both EU and EEA countries as neighbours in the North, mainly wilderness areas, Sweden and Norway. The cross-border utilisation of the spatial data infrastructure is still marginal but some examples are found in the global, European and Nordic cooperation that is largely based on supply:

- The Geological Survey of Finland has participated in Nordic cooperation with corresponding agencies and been involved in OneGeology Europe and European Soil Portal collaboration where the aim of geological institutes is to produce mutual spatial data services. The Geological Survey of Finland participates also in the construction of EGDI Scope data infrastructure and is involved in developing spatial data sets relating to the geology and ore deposits in the Fennoscandia area (e.g. FODD).
- The Baltic Marine Environment Protection Commission, HELCOM, uses spatial data sets for analysis and visualisation of environment information.
- The Finnish Transport Agency participates in the international Primar cooperation of electronic nautical charts which provides cross-border WMS service of nautical charts.
- The Finnish Transport Agency in wide cooperation with nautical authorities takes care of that the current view of the sea traffic is shared with the VTS centres (Vessel Traffic System) of other Baltic Sea countries and of the GOFREP ship reporting system in the Gulf of Finland.
- The Finnish Museum of Natural History participates in the European collaboration the aim of which is the Atlas Florae Europaeae and PESI, Pan-European Species Directories Infrastructure.
- The National Land Survey of Finland and the Finnish Geodetic Institute have participated in the ESDIN project funded by the EU and in the preparation of the ELF project the aim of which is the implementation of a mutual terrain data and spatial data service in cooperation with map facilities.

- The National Land Survey of Finland participates in the EuroGeographics collaboration of map facilities where map sets covering the Europe have been produced.
- The National Land Survey of Finland has participated in the ArcticSDI collaboration the aim of which is to create a joint spatial data infrastructure for the Arctic region.
- The Agrifood Research Finland has participated in the Predictor project where the application searches for weather and soil information from different countries' services (Finland, Switzerland, and Denmark).
- The Finnish Environment Institute has cooperated in the preparation of the Corine Land Cover product and utilised the interface services of the European Environment Agency, EEA.
- The Finnish Environment Institute is involved in the Nordic CHIN-GIS collaboration group (Chief for Hydrologic Institute in Norden) and cooperated with the authorities of Sweden and Norway in the harmonisation of the riverbed network and catchment areas as well as in the implementation of the Water Framework Directive (2000/60/EC).
- The Finnish Environment Institute is involved in the EU's FP7 Cryoland and HELM projects, participates in GMES (Copernikus) operation and is involved in the EU's Life+ project together with MTT, Metla and RKTL.
- The Statistics of Finland has participated in the GEOSTAT cooperation.

### **8.5 Use of transformation services**

The aim is to implement the interface services of the spatial data infrastructure so that they directly support necessary coordinate systems and data structures in Finland.

The coordinate transformation service provided by the Finnish Geodetic Institute has thus far been executed as the transformation service of the spatial data infrastructure that takes care of transformations between the previously typically widely in Finland used coordinate systems of the national coordinate system (KKJ) and the current pan European ETRS89 system and the coordinate system TM35FIN based on it. In 2012, 90,000 service requests were made.

## **9 Data sharing arrangements**

### **9.1 Data sharing arrangements between authorities**

#### **Sharing of public information**

The Finnish Government gave on 3 March 2011 a decision-in-principle on the sharing of public data. The purpose is uniform terms of use of the information and the information being mainly free-of-charge. The decision outlines that the sharing of data shall be piloted regarding spatial and map information. The aim of the sharing of public information was also written down in the government programme of 2012. The working group of the Finnish Ministry of Finance has in its report published an interpretation of the Finnish Act on Criteria for Charges Payable to the State according to which the public information available to all can be free-of-charge. The working group also published a proposal on the licence of open information. The Finnish Ministry of Finance has aligned that in the provision of data between authorities the aim is towards free-of-charge. In connection with the preparation for the 2014 budget, the Ministry has compiled plans for the sharing of data during 2014 and 2017, recorded the sharing and joint use of data as the purpose in the public administration's JulkICT strategy and prepared for the national Open Data programme.

#### **Finnish Information Administration Act**

The so-called Information Management Act (634/2011) entered into force in Finland on 1 September 2011 which aims for the interoperability of public administration's data systems. The principle is that information produced once should be used and overlapping collection of data should be eliminated. A means for achieving the aimed status is comprehensive total architecture work that the Ministry of Finance directs by producing reference architectures and recommendations.

#### **The Finnish Act and Decree on the Infrastructure for Spatial Data**

The purpose of the INSPIRE Directive is the European spatial data infrastructure and the interoperability of spatial data. The Directive has been implemented by a national law (421/2009) and a decree on the spatial data infrastructure (725/2009, amendment 128272009). The Decree names spatial data belonging to the scope of application and the authorities governing them. According to the provisions, discovery services are open and free-of-charge for all.

### **Reference architecture of spatial data and JHS recommendations**

The starting point of the public administration's spatial data reference architecture is the international standardisation and the INSPIRE architecture. The reference architecture illustrates the aimed status of the spatial data infrastructure that is sought after in the administration. In order to apply provisions and technical guidelines, the public administration's recommendations (JHS) have been issued and updated. A standard portfolio of spatial data on necessary standards has been compiled to be published in the Ministry of Finance's Interoperability portal.

### **Web service agreement of Paikkatietoikkuna**

In connection with the execution of the geoportal, a web service agreement has been concluded with the providers of spatial data which enables the browsing of spatial data in the map interface of the portal but also the connection of the provider's map layers with the help of the portal to map interfaces published in various websites. The data providers have been able to restrict the publication right to themselves, other authorities or allow it to all registered users of the portal.

### **Preparation of the service agreement of the spatial data infrastructure**

The Web Service Agreement prepared for the geoportal is a fixed-term agreement and the purpose is to replace it in 2013 by the Service Agreement of the Spatial Data Infrastructure aiming at expansive utilisation. The objective of the agreement based on the spatial data reference architecture is that the services and contents of the spatial data infrastructure are widely in open use and where necessary safely usable with rights pursuant to the user's role. The maintenance of the provided data products and services as well as licences is flexible.

## **9.2 Data sharing arrangements between authorities and the institutions and bodies of the Community**

By virtue of the INSPIRE Directive, the Commission has issued the Regulation on access to spatial data sets under harmonised conditions and as a support of it the guideline that is enclosed by licence models for the assignment of spatial data for the use of the EC institutions.

The INSPIRE Network is familiar with the licence models and has prepared on the basis of them versions for the use of the Finnish authorities. Model agreements for the surrender of data have been published on Paikkatietoikkuna.

Between Finland's environmental administration and the EEA as well as in several European cooperation projects (EIONET, ESDIN, ELF, etc.), the aim has been to develop practices in order to harmonise the assignment of data.

### **9.3 Obstacles impeding the data sharing**

According to the clarification *Paikkatiedon hyödyntäminen Suomessa 2010, Osa 1 Julkishallinnon organisaatiot* (Utilisation of spatial data in Finland 2010, Part 1 Organisations of Public Administration), over 90% of the participants in the query answered that there is a need to develop spatial data knowledge in the organisation. The availability, quality, pricing and accessibility of sets as well as the usability of tools were informed to form other significant obstacles of the utilisation.

Along with the public data sharing, the most significant obstacles in the utilisation of spatial data are probably in the knowledge. Sets and technology are available and largely interoperable. The use of knowledge could have significant benefit but the adoption of new operating ways requires new skills and takes time.

The utilisation of many sets is still being slowed down by unclear assignment practices and the terms of use. The expansion of the utilisation of spatial data into new sectors is being slowed down and prevented by the fact that the spatial data services are mainly provided with standard technology the knowledge of which limits to the spatial data field.

The lack of specification of data protection regarding personal information is still one of the main factors causing clarification and impeding the joint use of information that shall be taken into account in information services and terms of use when further assigning and using information.

## 10 Cost and benefit aspects

### 10.1 Estimate of the costs resulting from the implementation of the INSPIRE Directive

The implementation of the spatial data infrastructure causes many kinds of costs both to data providers and providers of support services. Achieving significant benefits also requires investment in the easy deployment of the spatial data infrastructure. Altogether approximately EUR 4.9 million have been invested in the development and execution of the spatial data infrastructure during 2010 and 2012:

- metadata EUR 200,000
- harmonisation of data EUR 400,000
- web services (discovery, view, download and transformation services) EUR 800,000
- monitoring and reporting EUR 200,000
- coordination and horizontal functions EUR 1,500 000
- development of the geoportal EUR 1,800 000

The spatial data providers note and the costs of the implementation of the infrastructure are difficult to specify. The total estimate of costs during 2010 and 2012 is approximately EUR 1.3 million. The costs of the implementation of interface services have in many organisations been estimated to vary between EUR 10 to 30,000, including their own work costs and the preparation of metadata. The implementation is generally based on existing spatial data software or solutions of open source code so significant software licence costs are not accrued. Organisations who try to provide at the same time the supply of harmonised data invest clearly more in the execution, i.e. several hundred thousand euros. The costs of the hosting service of the interface services of the spatial data infrastructure are still quite small for many organisations. So far no information about the costs of the hosting services has been collected.

The execution of the discovery service is based on the open source code solution (GeoNetwork). In order to develop the software according to the INSPIRE requirements, the National Land Survey of Finland has invested in work amounting to about EUR 30,000 and in the Nordic collaboration about EUR 20,000. The service is provided from the host environment of the facility and it does not result in significant additional costs.

The implementation of the transformation service in the Finnish Geodetic Institute has cost as a work cost



approximately EUR 30,000.

In total approximately EUR 1.8 million has been invested in the development of the national geoportal during 2010 and 2012, of which EUR 1.3 million concerns the purchased programming work. The National Land Survey of Finland has been responsible for the costs of the development. The first pilot of the portal in 2009 cost slightly more than EUR 80,000. The cost of the development of the first version of the production version in 2010 was EUR 72,000 of which approximately EUR 500,000 went to consultancy work. In the second phase, a service platform was developed with the help of which it is easy to publish map interfaces leaning on the spatial data infrastructure. The portal is wholly based on an open source code and in the second phase special investment was made to the modularisation and documentation of the code. The development costs of the second phase during 2011 and 2012 were EUR 1,050,000 of which approximately EUR 780,000 went to consultancy work. The development still continues and it has been divided into several projects where the source code is being utilised and expanded for different needs.

The costs of the expert and guidance service of the support services have been annually EUR 400,000. The costs include the tasks of the secretariat of the National Council for Geographic Information and the INSPIRE Network, collection and reporting of monitoring data, quality control, arrangement of training and production and maintenance of support material.

The data providers in each organisation are estimated to have spent 5 to 30 man-days annually for the cooperation, training and provision of monitoring data, and during 2010 and 2012 approximately the total of 2,200 man-days. The proportion of the participation in the training days is approximately 800 man-days and the participation in the INSPIRE Network's seminars and meetings as well as in the meetings of the INSPIRE information product groups is approximately 1,200 man-days.

In addition, approximately 200 man-days have been spent for the working of the National Council for Geographic Information.

### **10.2 Observed benefits**

In the implementation of the spatial data infrastructure, a lot of potential and concrete benefits both to the data providers and the users are observed. Benefits can be listed but the monetary value of the benefits cannot be estimated yet.

The authorities governing spatial data brought forward the following benefits in the query:

- Preparation of metadata facilitates the finding of spatial data sets and services and improves the customer service as well as reduces enquiries.
- Metadata and view services facilitate the assessment of usability of sets.
- Geoportal has provided visibility to the produced spatial data and increased its use.
- Easy publication of map interfaces has improved the service and saved implementation costs.
- Implementation of view and download services saves manual work previously used for the disclosure of data.
- Implementation of the spatial data infrastructure encourages to organise data providers' sets and services better than before and to cut-back unnecessary and overlapping sets.
- Transfer to a joint coordination saves work.
- View services are easy to utilise and they reduce the need to copy sets and thus save time and work.
- Background maps and orthophotos are easy to take into use as interface services.
- Spatial data utilised through interface services is up-to-date.
- The produced spatial data has been taken into use more expansively both outside the organisations and in their own operation.
- Organisations' own processes have developed and been specified and joint processes have been created.
- Spatial data infrastructure provides a lot of potential for the development of the organisations' processes.
- Interface services make possible the production and provision of new presentation styles of spatial data.

- New services can be easily provided with the interface services of the spatial data infrastructure.
- Cooperation between authorities has developed and become clearer.
- Implementation of interface services brings also inside an organisation more options regarding which software is used in utilising spatial data.
- Implementation of the spatial data infrastructure has improved the spatial data knowledge of the organisations.
- Learning and implementation of open source code software saves in the organisations' software licence fees and also in the organisations' internal system solutions.

The benefits of the spatial data infrastructure after the implementation of the view and download services and the preparation of metadata are obvious. Users will find the available spatial data from the discovery service and obtain as self-service the information needed as up-to-date in their application or the user interface of the browser.

## 11 Conclusions

The implementation of the national spatial data infrastructure has been a goal for a long time in Finland. The implementation of the INSPIRE Directive has strengthened the support processes and set goals and timetables and along with them activated the spatial data providers. With the support of the Directive, the national spatial data infrastructure has been concretised into compatible services and the awareness of spatial data and its possibilities has clearly increased.

As a result of services utilising spatial data infrastructure, the motivation of data providers to implement view and download services has increased. Through the services, the development of infrastructure is changing from supply-based into demand-based. The needs of customers start to guide the supply, bring forward quality shortcomings of the existing spatial data and finally steer for its part the data collection. Electronic services require that the service ability of interface services is good and possible interruptions in use remain short. A possibility to change their own process to utilise the created interface service is also opened up to the data providers.

The scope of application of the Directive is restricted to the themes listed in its Annexes. The restriction is limiting in respect of the needs of the national spatial data infrastructure and the society. Nationally, a discovery service covering all spatial data sets would be needed and all spatial data sets should be available through view and download services. With the help of the knowledge obtained in connection with the implementation of the Directive and technical arrangements, it would be possible to implement a comprehensive spatial data infrastructure. Instead, the harmonisation of data products should at the European level proceed from the needs of the users.

Significant trends, which change the nature of the spatial data infrastructure and the role of the public administration, are:

- data sharing
- collective data collection
- mobile applications

In the following, issues, which are tried to be solved by the implementation of the Directive,

are assessed: As issues regarding the Directive, the following spatial data qualities have been listed:

- availability
- quality
- structure
- accessibility
- data sharing

### **Availability**

The availability of spatial data has significantly improved. The general trend to open public information has supported the improvement in the availability of spatial data and the Directive has for its part encouraged the national data policy to focus on the opening of public information even though the Directive does not as such require for the opening of data. The Directive obliges to provide metadata generally free of charge and encourages providing a view service free of charge unless there is a special reason to collect a fee and even then to limit the fee only to extraction costs. In addition, the Directive requires that the electronic commerce services are implemented if fees are collected which for its part directs to offer services free of charge.

The Directive only roughly leads to the harmonisation of the terms of use. However, along the implementation of the Directive, a critical mass of sets and services become available which encourages the preparation of joint terms of use and the compilation of services into a joint infrastructure within a Member State.

### **Quality**

The improvement of the spatial data quality has started. Even though the implementation of the Directive does not require for the improvement of the quality of sets or for the collection of new data, the increase in the use of spatial data brings forward quality shortcomings and challenges the data providers to fix shortcomings observed in the sets. Finding shortcomings in the sets is not necessarily easy but a versatile use reveals shortcomings. The handling and correction of shortcomings causes work and costs to a data provider.

**Structure**

The compatibility of spatial data offered as map pictures has been realised and it satisfies a significant part of the users' needs. A structural spatial data is often defined too complicated on one hand in respect of the users' needs and on the other hand in respect of the structures supported by the available software. In the implementation of the Directive, a transition period of seven years has been reserved for the provision of harmonised data products so the harmonised provision will be realised within a long delay. In addition, harmonised data products may be too complex or too simple in which case parallel national products are needed.

**Accessibility**

The availability of spatial data has significantly improved through the development of the spatial data infrastructure. However, spatial data technology is largely special knowhow and its knowledge is limited. Already before the implementation of the INSPIRE Directive and alongside with its implementation companies in Finland have developed effective solutions for materials service. The availability of spatial data can be further improved and diversified by offering also other practices (Rest/Json interfaces, Linked data Sparql/Rdf).

The *discovery service* provides more spatial data sets than before and also service descriptions including interface service addresses. The discovery service is an interface service too, from where spatial data software can directly fetch metadata and provide them to be browsed by users. The descriptions of interface services essentially facilitate the implementation of spatial data as the applications may proceed to utilise view or download services the addresses of which are available in the discovery service. The method applied in the description of sets and services does not, however, correspond to its purpose very well.

The *view services* (WMS) are largely supported in software utilising spatial data and their utilisation is straightforward when the services provide map pictures in the same coordinate system. The implementation of the Directive has speeded up the transfer into joint coordinate systems in organisations governing spatial data.

The *download services* may be either file services or query services (WFS). The implementation of query services requires for the new version of the standard that is not yet supported in the software. Therefore the

data providers settle to implement file services. This leads to the copying of files and the significant benefit of the spatial data infrastructure remains unachieved.

The *transformation service* as a separate service is impractical and the view and download services shall require for the provision of compatible spatial data. In the future, required transformation services could be connected to various analysis services.

### **Data sharing**

The data sharing of spatial data is realised in respect of the view services (WMS) when the users can in their applications open map layers through the data network directly from the data providers' interface services. The data sharing is realised only partially in respect of the download services. File download services help the users of traditional spatial data software even though obtaining up-to-date information always causes additional work. The implementation of query services (WFS) should be a target state which is reached within a suitable transition period. The determination of European data products has improved different parties' understanding of the available information but in respect of data products, the supply of products of sufficiently simple structure should also be ensured.

**12 Annexes****12.1 List of organisation – names and contact information**

<b>National contact party of Member State</b>	
<b>Name of the authority</b>	<b>Ministry of Agriculture and Forestry of Finland</b>
<b>Contact information:</b>	
Postal address	PL 30, FI-00023 Valtioneuvosto, Finland
Telephone No.	+35829516001
Telefax No.	+358916054202
E-mail address	kirjaamo@mmm.fi
Website address (URL)	www.mmm.fi
Contact person	Antti Vertanen
Telephone No.	+358407204001
E-mail address	antti.vertanen@mmm.fi

<b>Coordination structure supporting the contact party</b>	
Name of the coordination structure	National Council for Geographic Information
<b>Contact information:</b>	
Postal address	PL 30, FI-00023 Valtioneuvosto, Finland
Telephone No.	
Telefax No.	
E-mail address	
Website address (URL)	<a href="http://www.paikkatietoikkuna.fi/web/fi/paikkatietoasiainneuvottelukunta">http://www.paikkatietoikkuna.fi/web/fi/paikkatietoasiainneuvottelukunta</a>
Contact person	Antti Vertanen (Chairman)
Telephone No.	+358407204001
E-mail address	antti.vertanen@mmm.fi
Contact person - substitute	Antti Rainio (Secretary)
Telephone No.	+358405325627
E-mail address	antti.rainio@nls.fi



Term	1.3.2010-28.2.2013
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<b>National Inspire Network of Finland</b>	
<b>Name of the community</b>	<b>National Inspire Network of Finland</b>
<b>Contact information:</b>	
Postal address	PL 84, FI-00521 Helsinki, Finland
Telephone No.	+358295301100
Telefax No.	+358295301101
E-mail address	inspire@maanmittauslaitos.fi
Website address (URL)	www.paikkatietoikkuna.fi/web/fi/inspire- verkosto
Contact person	Riitta Teiniranta (Chair)
Telephone No.	+358407399081
E-mail address	riitta.teiniranta@ymparisto.fi
Contact person - substitute	Antti Rainio (Secretary)
Telephone No.	+358405325627
E-mail address	antti.rainio@nls.fi
Term	1.6.2009-12.6.2013

Upon the collection of the monitoring information, an enquiry for the authorities governing spatial data was carried out for the support of the reporting. Comments from the state government were given from the following parties:

- Research Centre of Geology
- National Land Survey of Finland
- The Finnish Forest Research Institute
- The MTT Agrifood Research Finland
- The National Board of Antiquities
- The Finnish Game and Fisheries Research Institute
- Finnish Environment Institute
- Finnish Safety and Chemicals Agency
- Meteorological Institute
- Finnish Transport Agency
- Statistics Finland
- Ministry of Employment and the Economy

and from municipalities:

- City of Espoo
- City of Helsinki
- City of Hyvinkää
- City of Hämeenlinna
- City of Iisalmi
- City of Jyväskylä
- City of Kajaani
- Municipality of Kangasniemi
- City of Kauniainen
- Municipality of Kirkkonummi
- City of Kuopio
- City of Lappeenranta
- Municipality of Nurmijärvi
- City of Oulu
- City of Parainen

- City of Pori
- City of Porvoo
- City of Raisio
- City of Rauma
- City of Rovaniemi
- City of Seinäjoki
- City of Tampere
- City of Vaasa
- City of Valkeakoski
- City of Vantaa

### **12.1 List of sources used in the preparation of the report**

The report contains a lot of links to websites and documents which were used as the sources.

Publications:

Finnish National Spatial Data Strategy 2010–2015

Publications of the Ministry of Agriculture and Forestry 3/2010, Helsinki 2010

Paikkatiedon hyödyntäminen Suomessa 2010, Osa 1 Julkishallinnon organisaatiot

National Inspire Network of Finland 2010 (online publication)

Avoimen julkisen tiedon hyödyntämisen potentiaalista suomalaisissa yrityksissä

Aalto University, Diges ry (online publication)