



REPUBLIC OF ESTONIA  
LAND BOARD

# Estonian approach to implementation of INSPIRE directive

**Sulev Õitspuu**

Head of Bureau of Geoinfosystems  
Estonian Land Board

13.06.2016

# Contents

- INSPIRE coordination in Estonia
- INSPIRE implementation projects
- INSPIRE implementation status today
- INSPIRE system architecture
- Estonian geoportal
- Metadata
- Services
- Implementation questions
- Future plans

# INSPIRE Coordination Body

- There is no such a coordination organization
- Estonian Land Board is the INSPIRE contact point in Estonia.

## Key persons (from Estonian Land Board)

- Mr. Peep Krusberg – NCP and MIG-T secondary member
  - Mrs. Mariliis Aren – MIG-P primary member (Reporting)
  - Mr. Viljo Roolaht – MIG-P secondary member
  - Mr. Sulev Õitspuu – MIG-T primary member (Technical coordination)
  - Mrs. Age Sild (Metadata)
- + many others from different boards and administrations



# Who Is Involved?



REPUBLIC OF ESTONIA  
LAND BOARD



REPUBLIC OF ESTONIA  
MINISTRY OF THE ENVIRONMENT



REPUBLIC OF ESTONIA  
MINISTRY OF CULTURE



REPUBLIC OF ESTONIA  
AGRICULTURAL REGISTERS  
AND INFORMATION BOARD



REPUBLIC OF ESTONIA  
LAND BOARD



REPUBLIC OF ESTONIA  
MINISTRY OF ECONOMIC AFFAIRS  
AND COMMUNICATIONS



REPUBLIC OF ESTONIA  
ENVIRONMENTAL BOARD



REPUBLIC OF ESTONIA  
CIVIL AVIATION ADMINISTRATION



REPUBLIC OF ESTONIA  
TECHNICAL REGULATORY AUTHORITY



REPUBLIC OF ESTONIA  
ROAD ADMINISTRATION



REPUBLIC OF ESTONIA  
AGRICULTURAL BOARD



REPUBLIC OF ESTONIA  
STATISTICS BOARD



REPUBLIC OF ESTONIA  
MARITIME ADMINISTRATION



REPUBLIC OF ESTONIA  
NATIONAL HERITAGE BOARD

**+ many others...**



# National Digital Strategy

- The Land Board is responsible for the development of strategy for spatial data services
  - Spatial Data Act (adopted in 2011)
- The Land Board contributes to the development of national strategies (GIS related issues) and ensures that its own strategic documents (development plans) are in line with national principles



# INSPIRE implementation projects

# INSPIRE Implementation Projects



REPUBLIC OF ESTONIA  
LAND BOARD

## First project 2011-2012

*Funded by European Regional Development Fund  
Developer: Regio AS*



- Results of the project were:
  - Annex I and Annex II metadata available through Discovery service (CSW)
  - Annex I data managed by Land Board was harmonized and made available through the INSPIRE compliant view services (WMS)
  - Automated data transformation and updating
  - Central data repository of INSPIRE harmonized data was created
  - Estonian Geoportal was launched
  - It was based on ESRI software

# INSPIRE Implementation Projects



REPUBLIC OF ESTONIA  
LAND BOARD

## - Second project 2014-2016

*Funded by EEA Grants –*

*Project partner: Norway Kartverket*

*Developer: Alphagis OÜ*



## - Project goals were to:

- Update Annex I data to the latest data model and include data providers from other administrations in detailed level
- Harmonize data of Annex II and Annex III themes managed by Land Board and create WMS services
- Update existing converters and view services and create new converters and view services for new additional data
- Establish download services for all harmonized data (WFS and AtomFeed)
- Update hardware and software
- Improve usability of Estonian geoportal



# INSPIRE Implementation Projects



REPUBLIC OF ESTONIA  
LAND BOARD

## - Third project 2017-2020

*Funded by ...*

*Project partner ...*

*Developer ...*

## Content of the project:

- Implement INSPIRE directive, in particular, annex II ja annex III data themes
- Update database model to the newest version
- Update hardware
- ...



# INSPIRE Implementation Status Today



# Annex I

Data available through INSPIRE compliant services and using INSPIRE data model

All Annex I themes using now v4.0 data model

Theme	WMS	WFS	ATOM	Institutions + Comments
I-3 Geographic names	yes	yes	yes	Land Board
I-4 Administrative units	yes	yes	yes	Land Board, Maritime Administration + Maritime units included - Residence Of Authority are missing
I-5 Addresses	yes	yes	yes	Land Board - Postal codes are missing
I-6 Cadastral parcels	yes	yes	yes	Land Board (Land Cadastre) - Cadastral Zoning are missing
I-7 Transport networks	yes	yes	yes	Road administration (Road register) Maritime administration (open data) Civil Aviation Administration Land Board (Estonian Topographic database)
I-8 Hydrography	yes	yes	yes	Land Board (Estonian Topographic database), Environment agency (Environmental register)
I-9 Protected sites	yes	yes	yes	Environment agency (Environmental register), National Heritage Board (Heritage register)



# Annex II

Data available through INSPIRE compliant services and using INSPIRE data model

Theme	WMS	WFS	ATOM	Institutions + Comments
<b>II-1 Heights</b>	yes		yes	Land Board (Estonian Topographic database) Maritime administration (Navigation Charts)
<b>II-2 Land Cover</b>	yes	yes	yes	Land Board (Estonian Topographic database)
<b>II-3 Orthoimagery</b>	yes		yes	Land Board (Estonian Topographic database) Orthoimage coverage, Mosaic elements, ...
<b>II-4 Geology</b>	yes	yes	yes	Land Board (Geological base map) - Missing geophysics and hydrogeology data due the missing data model in ArcGIS for INSPIRE



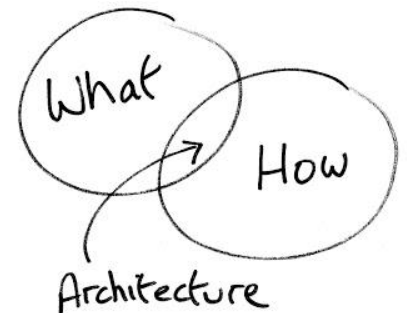
# Annex III

Only INSPIRE compliant and harmonized data containing services is listed

Theme	WMS	WFS	ATOM	Institutions + Comments
III-2 Buildings	yes		yes	Land Board (Estonian topographic database)
III-3 Soil	yes		yes	Land Board (Estonian Soil map)
III-6 Utility and gov.services	yes		yes	Land Board (Land Cadastre Restriction database)
III-9 Agricultural and aquaculture facilities	yes	yes		Estonian Agricultural Registers and Information Board
III-20 Mineral resources	yes		yes	Environment agency (Mineral deposits inventory data from Environmental Register)

	Theme	Ds/Ws/DI	Institution
RS	Area management/restriction/regulation zones and reporting units	yes/yes/yes	Land Board, Environmental Agency +
GG			
GN			
AU	Atmospheric conditions	yes/yes/-	Environmental Agency
AD			
CP			
TN	Bio-geographical regions	yes/yes/-	Environmental Agency
HY			
PS			
EL	Energy resources	yes/yes/-	Land Board +
LC			
OI			
GE	Environmental monitoring facilities	yes/yes/-	Environmental Agency
SU			
BU			
SO	Human health and safety	yes/yes/-	National Institute for Health Development
LU			
HH			
US	Land use	yes/yes/yes	Environmental Board + many others
EF			
PF			
AF	Meteorological measurement features	yes/yes/yes	Environmental Agency
PD			
AM			
NZ	Population distribution - demography	-	-
AC			
MF			
OF	Production and industrial facilities	yes/yes/-	Land Board, Enviromental Agency +
SR			
BR			
HB	Sea regions	yes/yes/-	Maritime administration
SD			
ER			
MR	Species distribution	yes/yes/-	Environmental Agency
	Statistical units	yes/yes/yes	Statistics Board

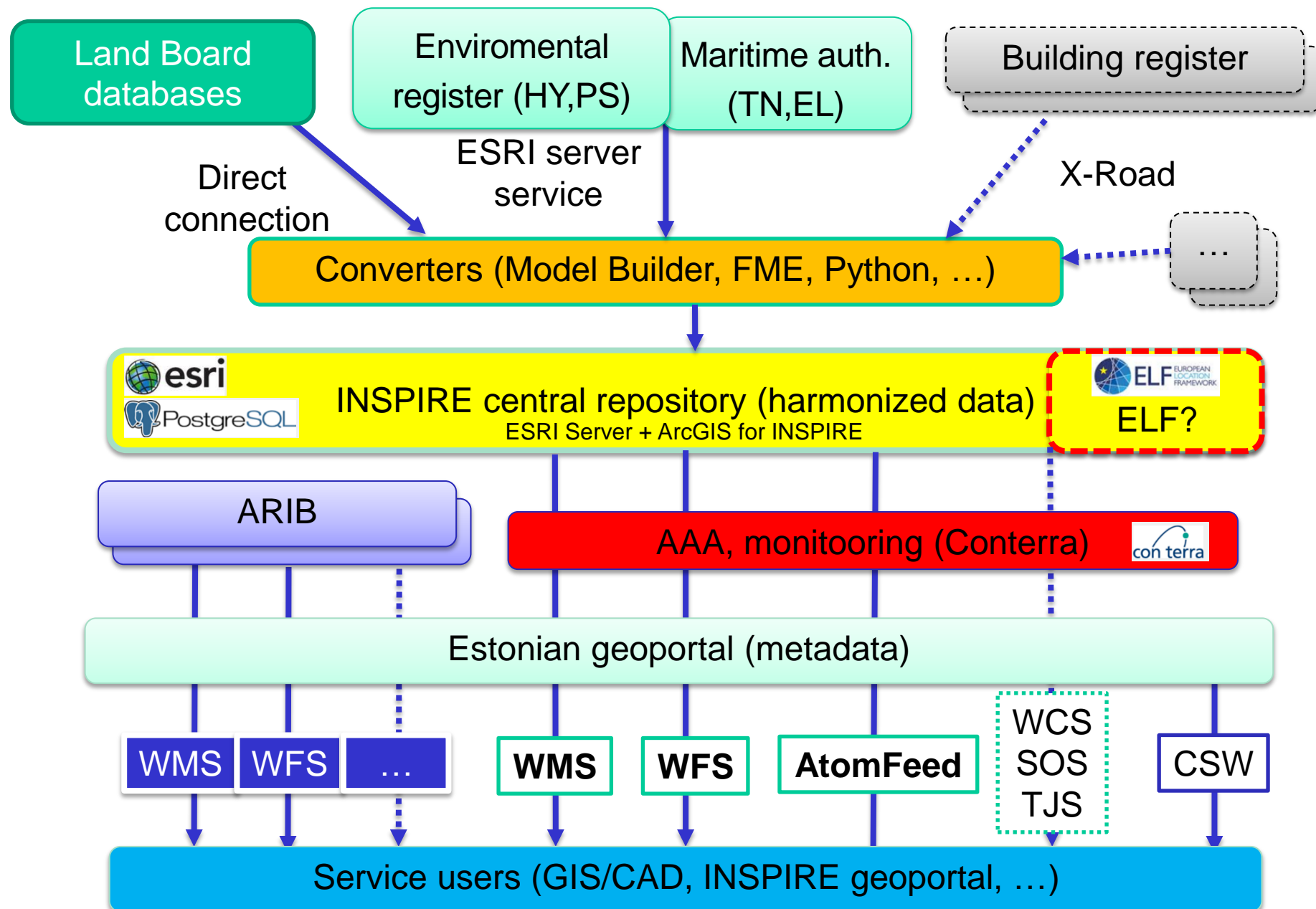
# INSPIRE System Architecture



# System Architecture



REPUBLIC OF ESTONIA  
LAND BOARD







# Estonian Geoportal



# Estonian Geoportal

- Estonian Geoportal - “gateway” through which spatial data (which is owned by the Estonian state, local governments and other legal persons governed by public law) is published and made available.
- Metadata search and CSW
- Map window with available INSPIRE map layers
- INSPIRE information (law, reporting, ...)
- Information about data providers
- Target: All meta- and spatial data in one portal



MAA-AMET



Home

Metadata

Services

About INSPIRE

Data owner

Map

Sign up

Help

Estonian Land Board Geoportal

# INSPIRE services

# INSPIRE layers on the map

- Addresses (AD)
- Buildings (BU)
- Geology (GE)
- Administrative units (AU)
- Hydrography (HY)
- Protected sites (PS)
- Cadastral parcels (CU)
- Geographical names (GN)
- Utility and governmental services (US)
- Elevation (EL)
- Land cover (LC)
- Mineral resources (MR)
- Orthomimagery (OI)
- Soil (SO)
- Transport networks (TN)
- Which software is suitable for WMS

## Administrative units (AU)

**Spatial dataset**

Administrative units from [Estonian Land Board geoportal](#)

Metainfo from [Administrative units from Estonian Land Cadastre](#)

**View Service (WMS)**

<http://inspire.maaamet.ee/arcgis/rest/services/public/au/MapServer/exprts/InspireView/service?>

Metainfo from [INSPIRE \(AU\) - Estonian administrative units and maritime zones \(WMS\)](#)

[GetCapabilities \(URL\)](#)

**Layers**

**Selected layers**

- ☒ Administrative Boundary 95%
- ☒ Administrative Unit 50%
- ☒ Baseline 50%
- ☒ Maritime Boundary 50%
- ☒ Internal Waters 50%
- ☒ Territorial Sea 50%
- ☒ Exclusive Economic Zone 50%
- ☒ Map 100%

Download Service (WFS)

<http://inspire.maaamet.ee/arcgis/rest/services/public/au/MapServer/exprts/InspireFeatureDownload/service?>

[GetCapabilities \(URL\)](#)

Download Service (AtomFeed)

[http://inspire.maaamet.ee/arcgis/rest/directories/arcgisforinspire/public/au\\_MapServer/datasetatom1.xml](http://inspire.maaamet.ee/arcgis/rest/directories/arcgisforinspire/public/au_MapServer/datasetatom1.xml)

According to your preference in data format, choose a right link for download:

Fail	Uuendatud	Faili suurus
<a href="#">INSPIRE (AU) - Haldusüksused (GML)</a>	2016-02-28	52.7 MB
<a href="#">INSPIRE (AU) - Haldusüksused (SHP)</a>	2016-02-28	69.2 MB
<a href="#">INSPIRE (AU) - Haldusüksused (MIP/MIP)</a>	2016-02-28	54.6 MB

- ☒ Oil or Gas Pipe
- ☒ Oil Gas Appurtenance
- ☒ Electricity Network
- ☒ Electricity Cable
- ☒ Electricity Appurtenance

**Selected layers**

- ☒ Electricity Appurtenance 100%
- ☒ Electricity Cable 100%
- ☒ Oil Gas Appurtenance 100%

- [INSPIRE \(AD\) - Eesti aadressid \(WMS\)](#)
- [INSPIRE \(AD\) - Eesti aadressid \(WFS\)](#)
- [INSPIRE \(LC\) - Eesti maakate \(WMS\)](#)
- [INSPIRE \(AD\) - Eesti aadressid \(Atom\)](#)
- [INSPIRE \(CP\) - Eesti katastriüksused \(WMS\)](#)
- [INSPIRE \(GN\) - Eesti kohanimed \(WMS\)](#)

# Metadata

<http://inspire.maaamet.ee/>



# Metadata

# Metadata

- Collecting of metadata is centralized. Esri Geoportal Metadata engine is used in Estonian Geoportal.
- Every board or administration has appointed one authorized user, who is responsible for keeping metadata up to date.
- Catalog Service for WEB (CSW) is provided to publish metadata
- 167 metadata records
- 131 containing INSPIRE compliant metadata

# Metadata

## Proposals for naming metadata records

INSPIRE  
compliant

INSPIRE  
theme

Theme name


Service type

 [service] INSPIRE (CP) - Eesti katastriüksused (WMS)

Maa-ameti poolt pakutav INSPIRE vaatamisteenus, mille kaudu ...[\(show more\)](#)

 [service] INSPIRE (BU) - Eesti ehitised (Ator


Maa-ameti poolt pakutav INSPIRE eelgenereeritud failide alla

 [service] INSPIRE (MR) - Eesti maavarad (W


Maa-ameti poolt pakutav INSPIRE vaatamisteenus, mille kau

 [service] INSPIRE (CP) - Eesti katastriüksused

Maa-ameti poolt pakutav INSPIRE vaatamisteenus, mille kau

 [service] INSPIRE (MR) - Eesti maavarad (AI

Maa-ameti poolt pakutav INSPIRE eelgenereeritud failide alla

 [service] INSPIRE (MR) - Eesti maavarad (W

Maa-ameti poolt pakutav INSPIRE vaatamisteenus, mille kau


 [service] INSPIRE (MR) - Eesti maavarad (AI


Maa-ameti poolt pakutav INSPIRE eelgenereeritud failide alla


 [service] INSPIRE (CP) - Eesti katastriüksused


Maa-ameti poolt pakutav INSPIRE allalaadimisteenus, mille ku

 INSPIRE (AD) - Eesti aadressid (Ator


 INSPIRE (AU) - Eesti haldus- ja asu


 INSPIRE (GN) - Eesti kohanimed (AI


 INSPIRE (HY) - Eesti vooluveekogu


 INSPIRE (GN) - Eesti kohanimed (W

 INSPIRE (AD) - Eesti aadressid (W

 INSPIRE (AD) - Eesti aadressid (W

 INSPIRE (HY) - Eesti vooluveekogu

 INSPIRE (HY) - Eesti veekogud ja v

 INSPIRE (AU) - Eesti haldus- ja asu

### Spatineo Ranking

Top INSPIRE Services in Estonia (27) and page 1/4 ►

1. INSPIRE (HY) - Eesti veekogud ja veeobjektid (WMS)  
inspire.maaamet.ee
2. INSPIRE (TN) - Eesti õhutranspordivõrk (WMS)  
inspire.maaamet.ee
3. INSPIRE (AU) - Eesti haldus- ja asustusüksused ning merealapiirid (WMS)  
inspire.maaamet.ee
4. INSPIRE (HY) - Eesti hüdrograafilised tehisobjektid (WMS)  
inspire.maaamet.ee
5. INSPIRE (TN) - Eesti transpordivõrgu ühised elemendid (WMS)  
inspire.maaamet.ee
6. INSPIRE (TN) - Eesti transpordivõrgud: teed ja rööbasteed (WMS)  
inspire.maaamet.ee
7. INSPIRE (CP) - Eesti katastriüksused (WMS)  
inspire.maaamet.ee
8. INSPIRE (PS) - Eesti kaitsealused kohad (WMS)  
inspire.maaamet.ee

# Structured naming of metadata makes the choice easier



Spatineo Ranking

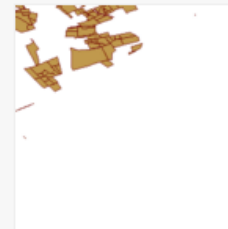
Top INSPIRE Services in Estonia (27) and page 1/4 ▶

1. INSPIRE (HY) - Eesti veekogud ja veeobjektid (WMS)  
inspire.maaamet.ee
2. INSPIRE (TN) - Eesti õhutranspordivõrk (WMS)  
inspire.maaamet.ee
3. INSPIRE (AU) - Eesti haldus- ja a  
inspire.maaamet.ee
4. INSPIRE (HY) - Eesti hüdrograafi  
inspire.maaamet.ee
5. INSPIRE (TN) - Eesti transpordiv  
inspire.maaamet.ee
6. INSPIRE (TN) - Eesti transpordiv  
inspire.maaamet.ee
7. INSPIRE (CP) - Eesti katastriüks  
inspire.maaamet.ee
8. INSPIRE (PS) - Eesti kaitsealuse  
inspire.maaamet.ee

Top Services in Belgium (1415) page 1/177 ▶

1. WMS Percelen in eigendom Vlaamse overheid  
bzgis.vlaanderen.be
2. Wegenregister  
geoservices.informatievlaanderen.be
3. Wegenregister  
geo.agiv.be
4. WMS GRB  
geoservices.informatievlaanderen.be
5. ERRUISSOL - Risque de ruissellement diffus  
geoservices.wallonie.be
6. IMAGERIE\_ORTHO\_2009\_2010  
geoservices.wallonie.be
7. BRUGIS WMS INSPIRE FRE  
www.geo.irisnet.be
8. WMS Departement Ruimte Vlaanderen  
geoservices.informatievlaanderen.be

Preview



Data provider: Departement Bestu  
Agentschap Facilitair Bedrijf

Country: Belgie

City: Brussel

1. INSPIRE View Service  
www.geoportal.it
2. INSPIRE View Service  
www.geoportal.it
3. INSPIRE View Service  
www.geoportal.it
4. INSPIRE View Service  
www.geoportal.it
5. INSPIRE View Service  
www.geoportal.it
6. INSPIRE View Service  
www.geoportal.it
7. INSPIRE View Service  
www.geoportal.it
8. INSPIRE View Service  
www.geoportal.it



# AtomFeed








# AtomFeed Download Services

- GML, SHP, MID/MIF formats are available
- Structured name is used

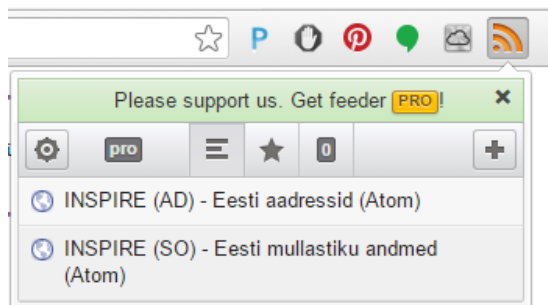
Structured File name:            Update Date            File Size

Fail	Uuendatud	Faili suurus
<a href="#">INSPIRE (AU) - Haldusüksused(GML)</a>	2016-02-28	52.7 MB
<a href="#">INSPIRE (AU) - Haldusüksused(SHP)</a>	2016-02-28	69.2 MB
<a href="#">INSPIRE (AU) - Haldusüksused(MID/MIF)</a>	2016-02-28	54.6 MB

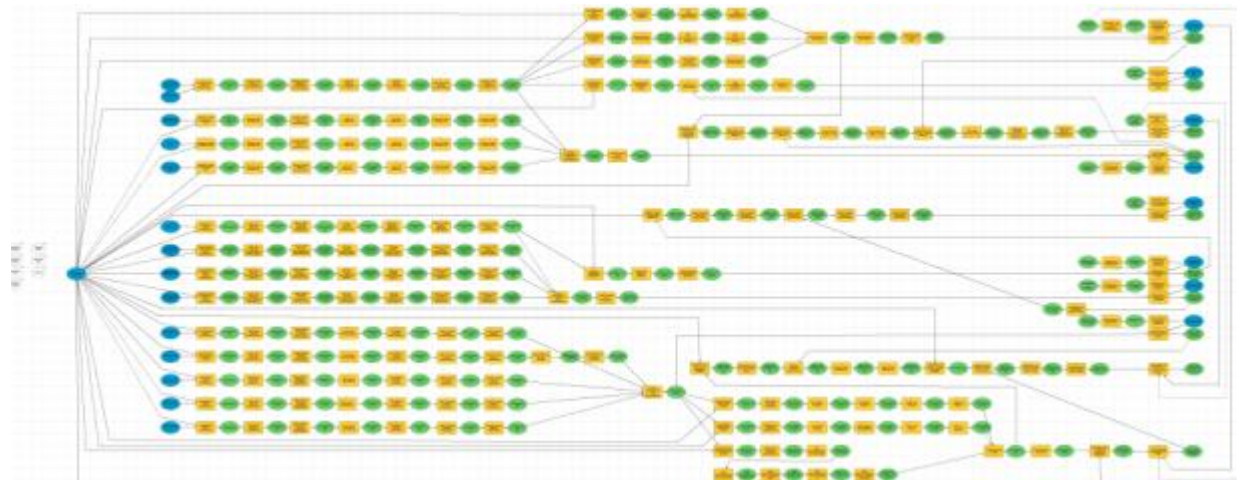
File name includes format and date information

Name	Date	Type	Size
 INSPIRE_AD_Aadressid_Laanemaa_GML_28022016.zip	29.02.2016 9:49	Compressed (zipp...	1 476 KB
 INSPIRE_MR_Maavarad_SHP_18012016.zip	29.02.2016 9:49	Compressed (zipp...	11 895 KB
 INSPIRE_MR_Maavarad_MIF_18012016.zip	29.02.2016 9:49	Compressed (zipp...	9 904 KB

Updates available through feed reader



# Transformation Services



# Transformation Services

- Services to transform spatial and alphanumeric data from native format and structure to INSPIRE format.
- Database schema transformation
  - Transformation has been done with converters (Python, Data Interoperability, Model Builder, ...)
- Coordinate system transformation
  - View and download services support directly coordinate system transformation



# Questions remain...



- Some themes contain some open and some restricted data. How to make download services partly freely available? Separate services?
- Completeness of downloaded dataset. What alphanumeric data should be included in download service response?
- WMS GetFeatureInfo – it is not mandatory to have GetFeatureInfo. What alphanumeric data should be included?
- Visual layout
- And a lot of questions in very detailed level





# Next Steps in INSPIRE Implementation

# Next Steps

- Next INSPIRE project planned 2017-2020
- Annex III themes harmonization and services
- Continuous update of available data and data models (more data should be included)
- Tighter cooperation with other authorities is needed (especially with Annex III)
- Negotiation with ESRI to include Annex III data models into ArgGIS for INSPIRE (option is change software platform)
- Increase the usage of Estonian geoportal
- Increase the usage of INSPIRE services



REPUBLIC OF ESTONIA  
LAND BOARD

<http://geoportaal.maaamet.ee/>  
<http://inspire.maaamet.ee/>  
<http://xgis.maaamet.ee/>  
<http://www.maaamet.ee/>

Thank you! : Tänan!  
and  
Be Inspired!

Sulev Õitspuu  
Head of Bureau of Geoinfosystems  
Estonian Land Board  
[sulev.oitspuu@maaamet.ee](mailto:sulev.oitspuu@maaamet.ee)