



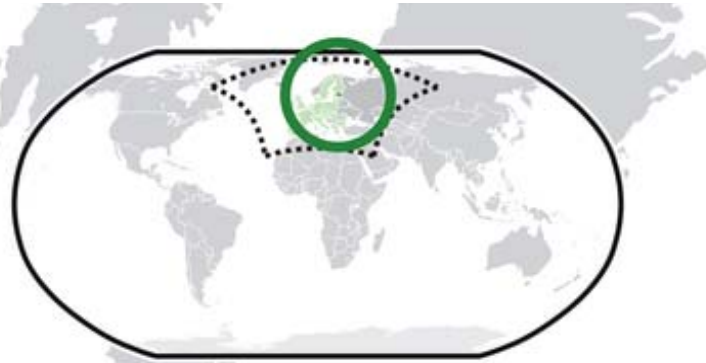
REPUBLIC OF ESTONIA  
LAND BOARD

# INSPIRE Implementation in Estonia using ArcGIS

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Estonian Land Board

26.09.2016



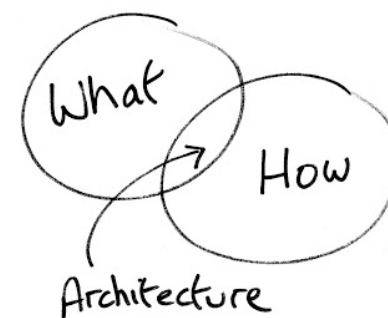
- Population: 1,3 million (69% Estonians)
- Area: 45,339 km<sup>2</sup>
- 15 counties
- Estonia is almost 50% forest
- Estonia has over 2000 islands
  
- Estonia's capital **Tallinn** is the best preserved medieval city in Northern Europe



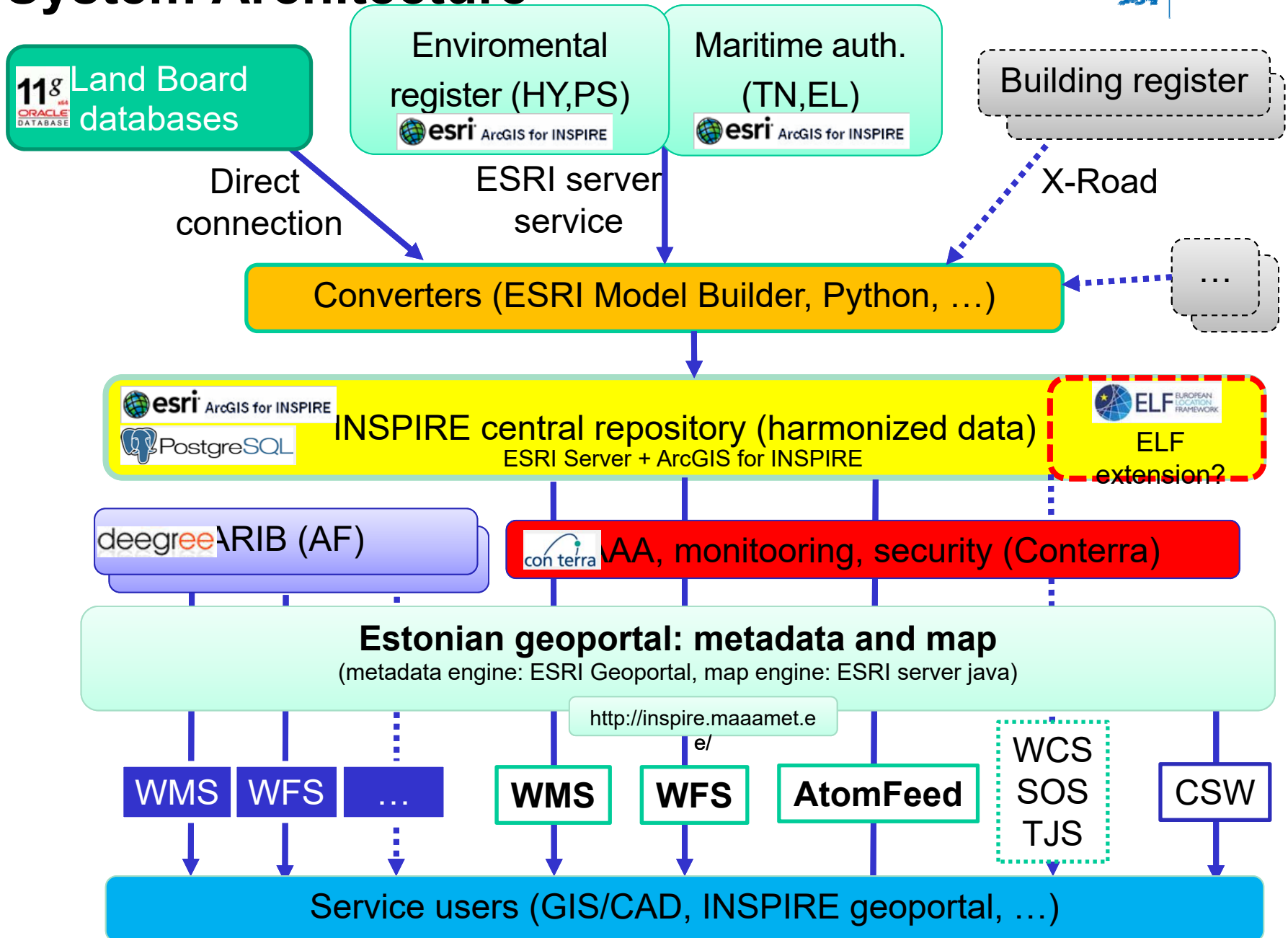
For more information visit: <https://www.visitestonia.com/en/>

<https://commons.wikimedia.org/>

# Central INSPIRE System Architecture



# System Architecture





# INSPIRE Implementation using ArcGIS



# Annex I

Data available through INSPIRE compliant services and using INSPIRE data model

All Annex I themes using now v4.0 data model

Open data and free services

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
II-1 Heights	yes		yes	Land Board (Estonian Topographic database) Maritime administration (Navigation Charts)
II-2 Land Cover	yes	yes	yes	Land Board (Estonian Topographic database)
II-3 Orthoimagery	yes		yes	Land Board (Estonian Topographic database) Orthoimage coverage, Mosaic elements, ...
II-4 Geology	yes	yes	yes	Land Board (Geological base map) - Missing geophysics and hydrogeology data due to the missing data model in ArcGIS for INSPIRE





# Annex III – available themes

Only INSPIRE compliant and harmonized data containing services is listed  
WFS is missing due the missing ArcGIS for INSPIRE data models

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 <b>Not a part of Land Board repositorium</b>
III-20 Mineral resources	yes		yes	Environment agency (Mineral deposits inventory data from Environmental Register)



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



# Data availability: Estonian Geoportals

# 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
  - Download data (WFS, AtomFeed)
  - INSPIRE information (law, reporting, ...)
  - Information about data providers

## INSPIRE services

## INSPIRE layers on the map

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/externs/InspireView/service?>

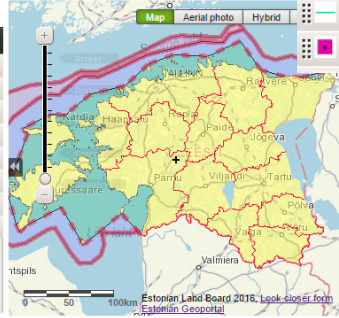
Metainfo from [INSPIRE \(AU\) - Estonian administrative units and maritime zones \(WMS\)](#)

[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/externs/InspireFeatureDownload/service?>

[GetCapabilities \(URL\)](#)

**Download Service (AtomFeed)**

[http://inspire.maaamet.ee/arcgis/rest/directories/arcgisforinspire/public/au\\_MapServer/datasetatoma1.xml](http://inspire.maaamet.ee/arcgis/rest/directories/arcgisforinspire/public/au_MapServer/datasetatoma1.xml)

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

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

Oil or Gas Pipe

Oil Gas Appurtenance

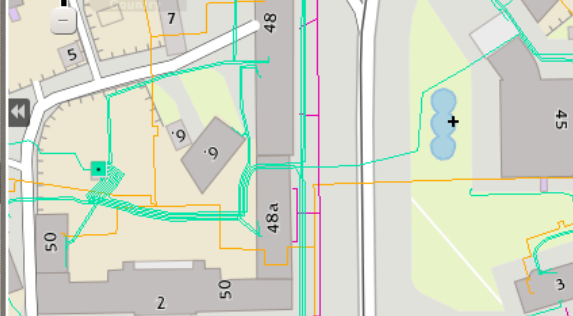
Electricity Network

Electricity Cable

Electricity Appurtenance

**Selected layers**

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



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

## Metadata

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



# Questionnaire

# Questionnaire of usage of ArcGIS for INSPIRE



- May 2016: Questionnaire about usage of ArcGIS for INSPIRE software for INSPIRE harmonisation and publishing services in EU member states.
  - Institution?
  - Is it in use in state level, county level, institution level, ...?
  - Version on ArcGIS for INSPIRE?
  - Database used (PostgreSQL, Oracle,...)?
  - Data themes harmonized?
  - Data themes made available?
  - Service types (WMS; WFS; AtomFeed;...)?
  - Which are the most needed data models still missing?
  - How is implemented themes (if any), that not have yet ArcGIS for INSPIRE data model?
  - Software problems (bugs, ...)?

# Questionnaire of usage of ArcGIS for INSPIRE



- 11 countries answered to the questionnaire (+ Estonia).
  - The answers shows that ArcGIS for INSPIRE is used only in some EU countries.
    - Used in state level: Latvia, UK(Scotland), Poland, Luxembourg, Czech Republic, Estonia (and Lithuania?)
    - Regional level – Croatia, Germany
    - Institution level –Portugal
    - Not used – France, Netherlands, Belgium
  - Estonia, Latvia, Poland and Luxembourg are using software to publish all data themes, other only some themes or some regions.

\* All statistics based on 12 country's data



# Questionnaire of usage of ArcGIS for INSPIRE



- What data models are needed?
  - Answers shows, that Annex II EL, OI themes and GE theme missing packages is urgently needed.
  - From Annex III all data themes (Luxembourg and Estonia) but especially BU, SO, US (five countries including LU and EE), EF, PF, AM, NZ, ER and MR is mentioned, but is interesting, that environmental reporting themes like SD, HB, AF, ... is not mentioned.
  - As well no statistical themes is not mentioned. In Estonia, for example, Statistics Estonia is interested to publish their SU data through central database.

\* All statistics based on 12 country's data

# Questionnaire of usage of ArcGIS for INSPIRE



- Software problems?
  - Performance issues (AD, GN)
  - Problems with ESRI WMS/WFS compliance to OGC and INSPIRE standards
  - Problems with WFS GML content compliance - not all mandatory fields are included.
  - Problems with WMS/WFS/AtomFeed metadata (does not fully validate on different metadata validators (ELF, OGC, INSPIRE))
  - Problems with symbology (not all INSPIRE default symbology were included or there is problems to show it)
  - The INSPIRE Geodatabase templates are not based on INSPIRE GML schemas but on the UML schemas using proprietary encoding rules.
  - Problems with support for special characters (like: ó, ž, ž, ņ, etc.) in WFS services.
  - Lack of documentation

# Questionnaire of usage of ArcGIS for INSPIRE



- Result Excel online

- [https://1drv.ms/x/s!Am8WO4oBGp0Cgfo6\\_d65q9nEUskW3w](https://1drv.ms/x/s!Am8WO4oBGp0Cgfo6_d65q9nEUskW3w)

\* All statistics based on 12 country's data

# ArcGIS for INSPIRE

- + Good solution for central database solution
- + A comprehensive and effective INSPIRE data model
- + Managed through the user interface
- + Easy to publish the services and manage them
- Lack of information of development plans, sometimes poor documentation and slow support
- Slow addition of data models
- Performance issues
- Limitations in configuration



MAA-AMET

# More information about INSPIRE implementation in Estonia:

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(You can find me in Barcelona INSPIRE  
conference)

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

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

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

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