

Some practices of Geospatial coding and referencing statistics in Finland and in Europe

Marja Tammilehto-Luode

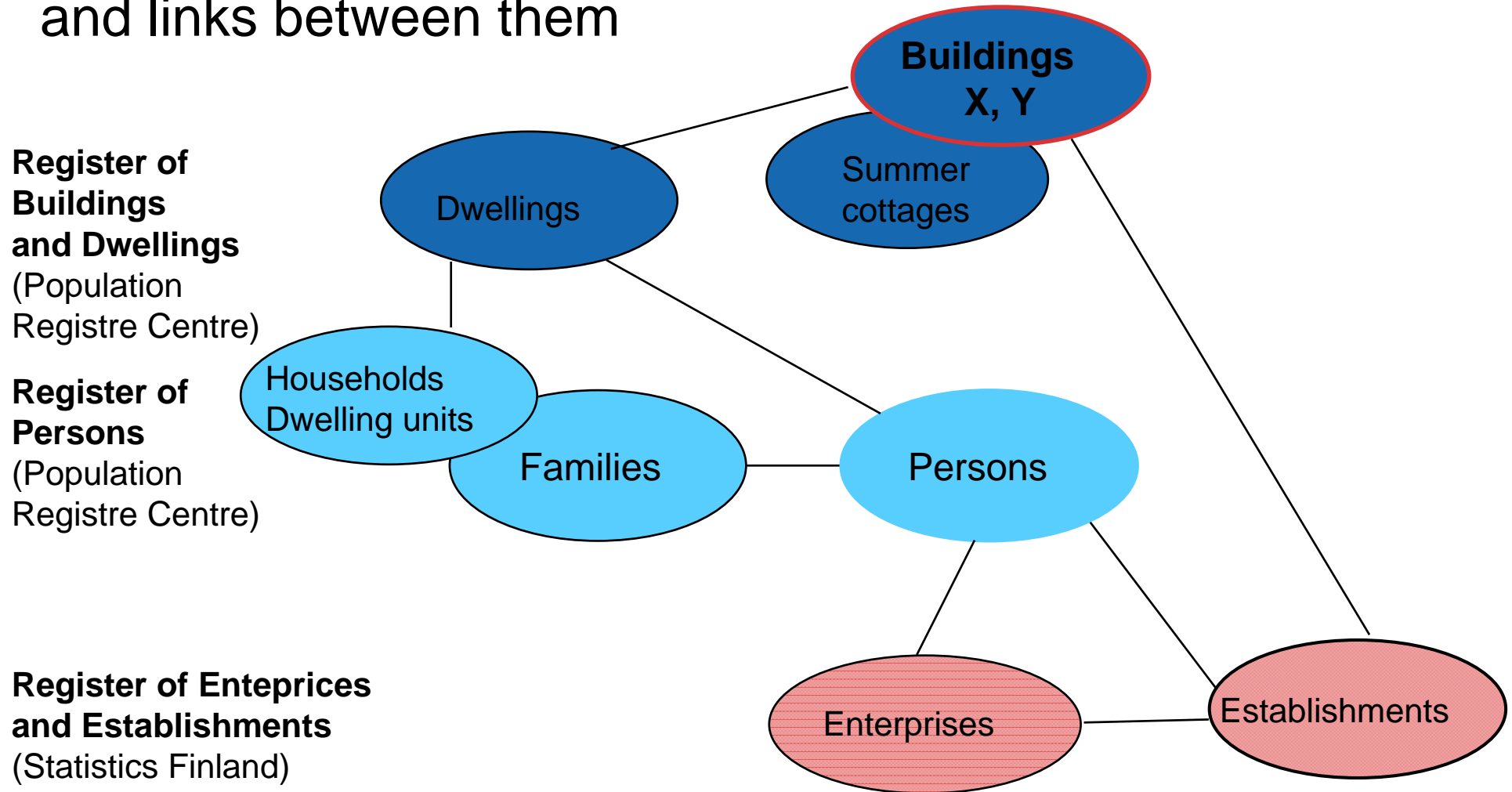
UN Expert Group on the Integration of Statistical and
Geospatial Information

30.10. – 1.11.2013

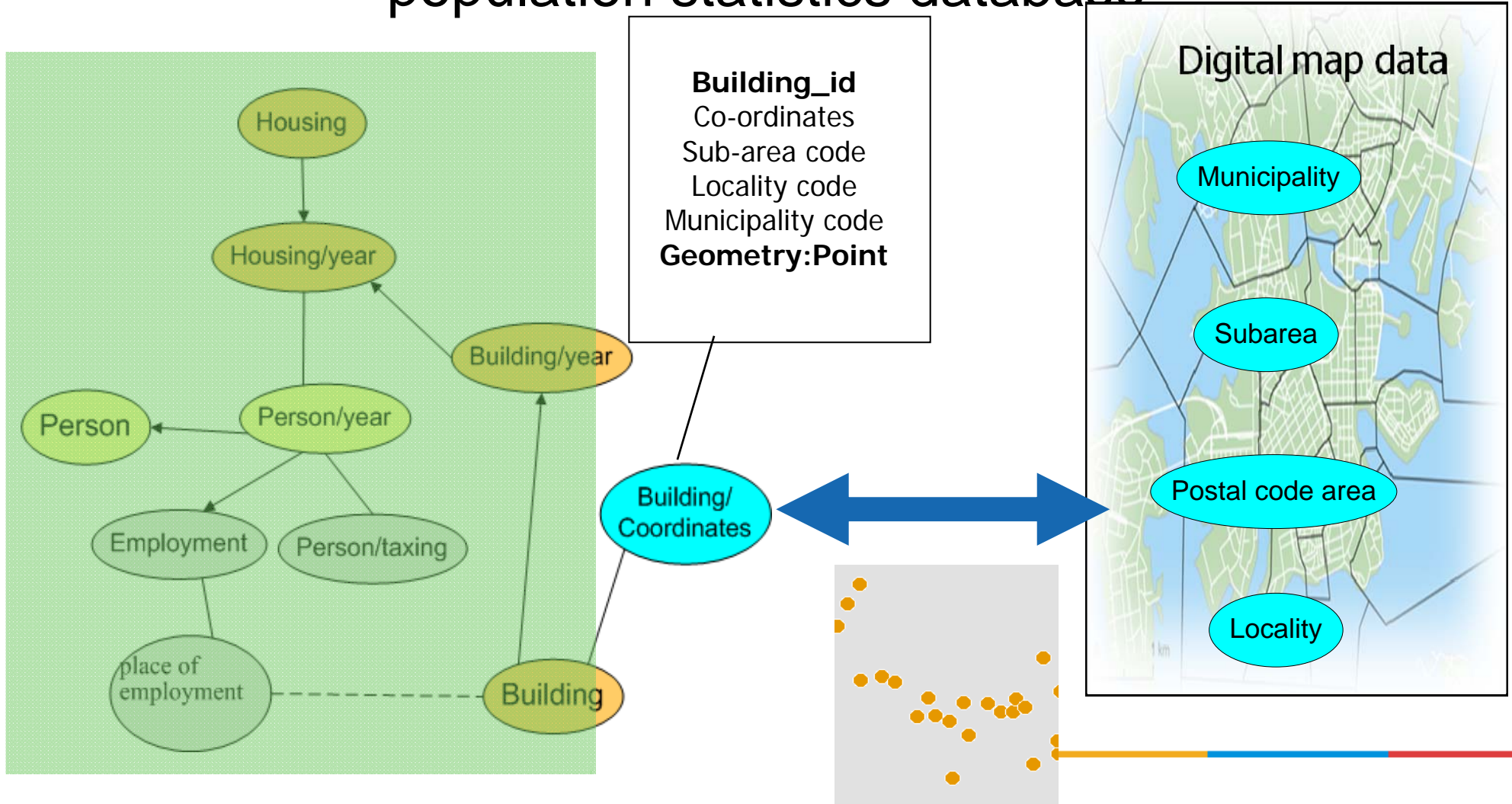
Some practices of Geospatial coding and referencing statistics in Finland and in Europe

- Capabilities for geocoding
- Data warehouse + Geodatabase
- Statistical grids
- Point-based geospatial statistical framework
- National and European cooperation and standards
- Challenges for the future

Units belonging to the register based statistics and links between them



Links of statistical entities, building coordinates and map data in the population statistics database





Creating spatial statistics

564004020 Kaukovainio	4828
564004021 Hiironen	1849

Table

Join_Output

FID	Shape	FID 1	rnro	vakiyht	vuosi	SHAPE fid	OBJECTID	PIENLUE	KUN
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190	Point	237	4151429	19	2010	3846921	20133	564004020	564
191	Point	238	4151601	18	2010	3847089	20133	564004020	564
192	Point	240	2242912	3	2010	4141961	20133	564004020	564
193	Point	251	4243089	75	2010	4141962	20133	564004020	564
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199	Point	2	2243217	11	2010	710002	20140	564004021	564
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Aggregate

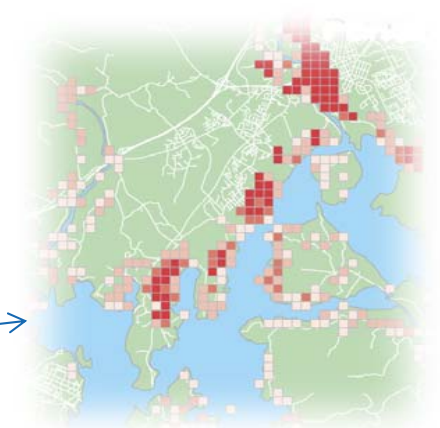
Derive

Territorial units

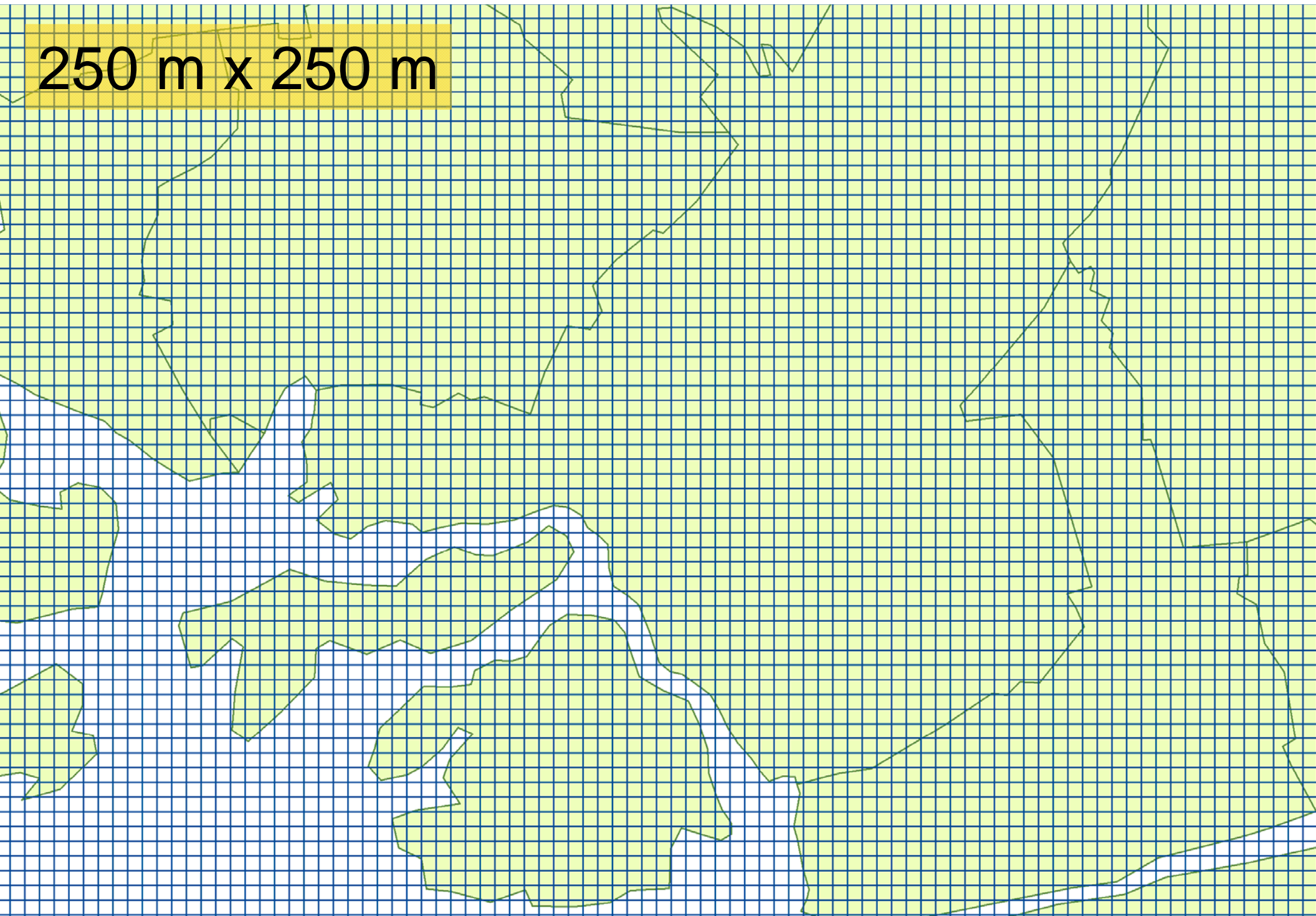
- Grids (e.g. 1 km x 1 km)
- Municipal subareas
- Postal code areas
- Localities

Basic areas

- Municipalities (*LAU 2*)
- Subregions (*LAU 1*)
- Regions (NUTS 3)
- Suuralueet (NUTS 2)
- Aluehallintovirastot (AVI)
- Elinkeino,- liikenne- ja ympäristökeskukset (ELY-keskukset)
- Tilastollinen kuntaryhmitys
- Kielisuhde
- On demand



250 m x 250 m



Kartat - Kartor - Maps

Kartat - Kartor - Maps

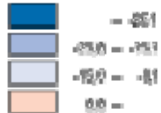
Alle 7-vuotiaiden määrän muutos seurakunnittain

Förändring av antalet barn under 7 år efter ekonomisk region

Change in the number of children aged under 7 by sub-regional unit

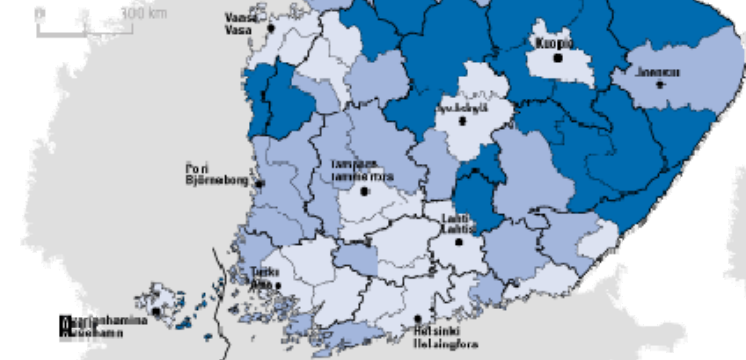
1995–2005

Muutos, %
Förändring, %
Change, %



Koko maa: -12.1
Hela landet: -12.1
Whole country: -12.1

0 100 km



Väestöllinen huoltosuhte seurakunnittain

Den demografiska försörjningsgraden efter ekonomisk region

Demographic dependency ratio by sub-regional unit

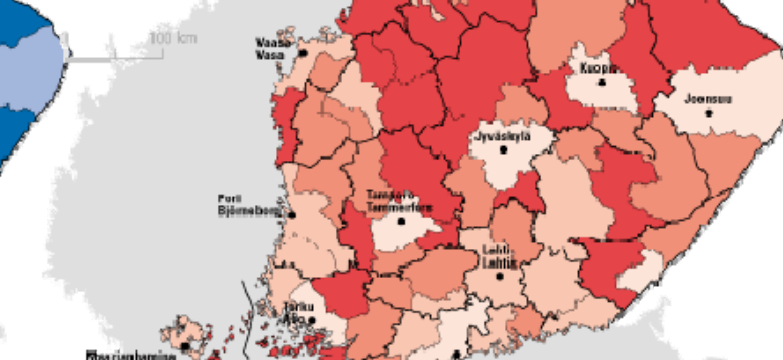
2005

Lapsia ja vanhuksia 100 työikäisen kohden
Barn och äldre per 100 personer i arbetsför ålder
Children and elderly people per 100 persons of working age



Koko maa: 59
Hela landet: 59
Whole country: 59

0 100 km



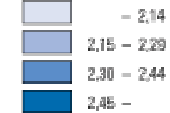
Asuntokuntien keskikoko kunnittain

Bostadshushållens medelstorlek i kommuner

Medium size of household dwellings by municipality

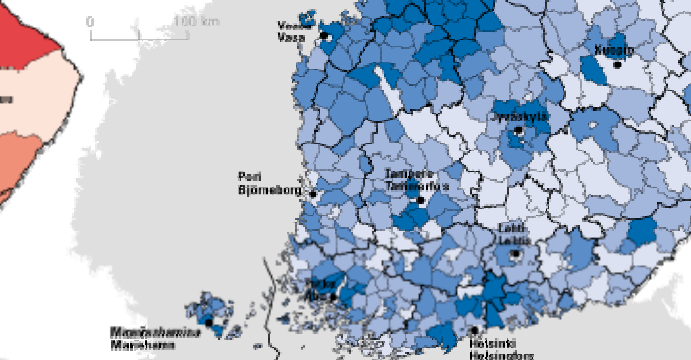
2004

Henkilöä
Personer
Persons



Kokoa: 2.14
Hela landet: 2.14
Whole country: 2.14

0 100 km



Alueet 1.1.2006 mukaisesti - Områdesindelningen enligt 1.1.2006 - Regional division as on 1 January 2006

Maailma - Earth - Suomi: TK, Huoltosuhteet väestö- ja kansantaloustilastiet - SC, Indrivärdshöften, befolknings- och ekonomiska statistik - SE, Regional Statistics, demographic and economic Statistics

Ennen kuin käytät tätä karttaa, tarkista, että se on päivitettynä. Tämä kartta on tarkoitettu vain yleiseen käyttöön. Se ei ole tarkoitettu käytettäväksi oikeudellisiin tarkoituksiin.

Ennen kuin använder denna kartta, kontrollera att den är uppdaterad. Denna kartta är avsedd för allmän användning. Den är inte avsedd för användning i rättsliga syften.

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Alueet 1.1.2006 mukaisesti - Områdesindelningen enligt 1.1.2006 - Regional division as on 1 January 2006

Maailma - Earth - Suomi: TK, Huoltosuhteet väestö- ja kansantaloustilastiet - SC, Indrivärdshöften, befolknings- och ekonomiska statistik - SE, Regional Statistics, demographic and economic Statistics

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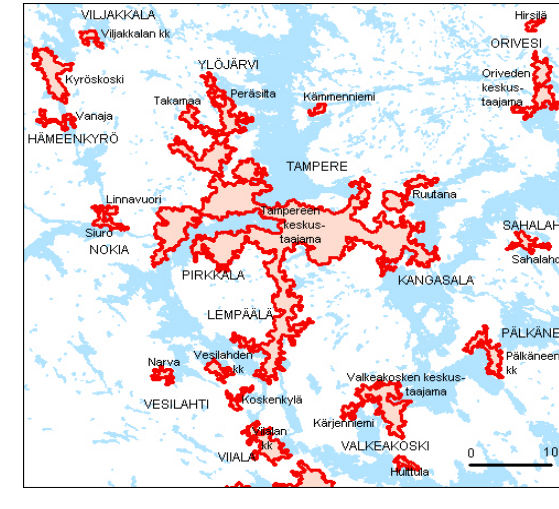
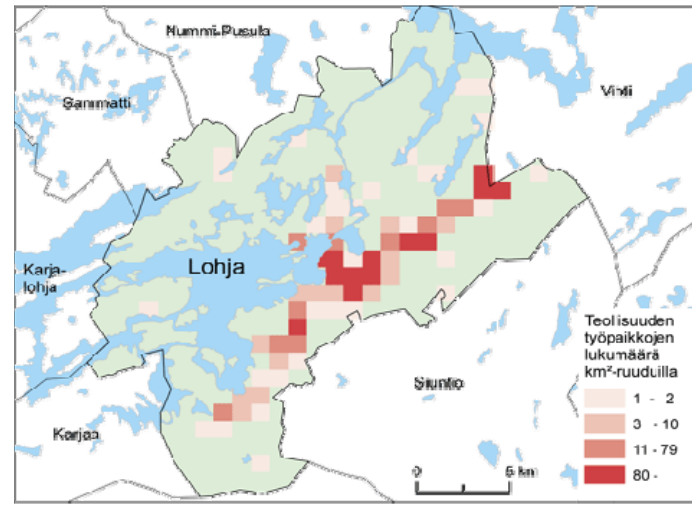
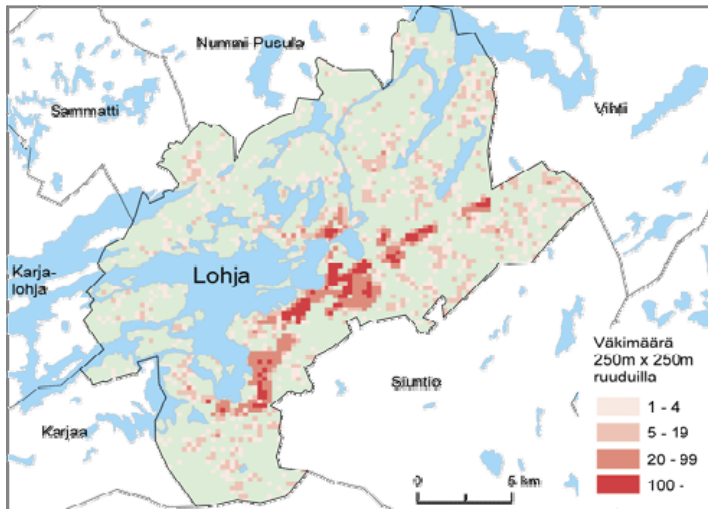
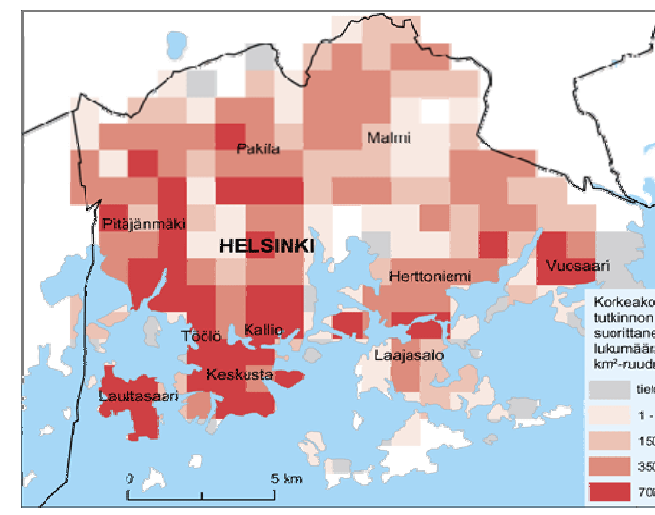
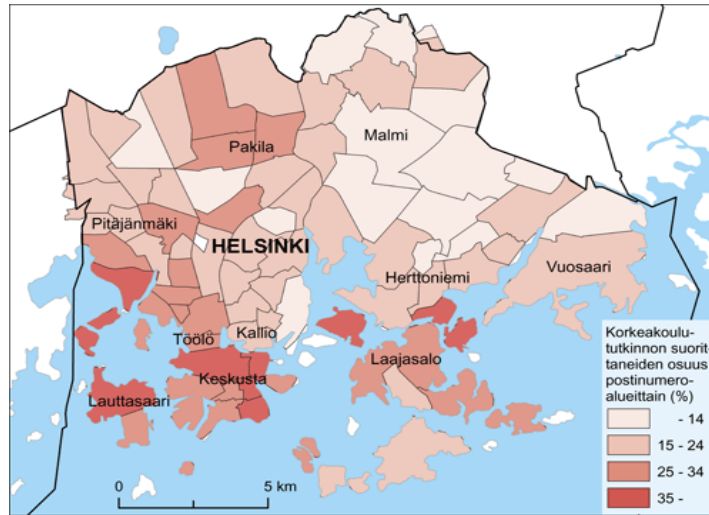
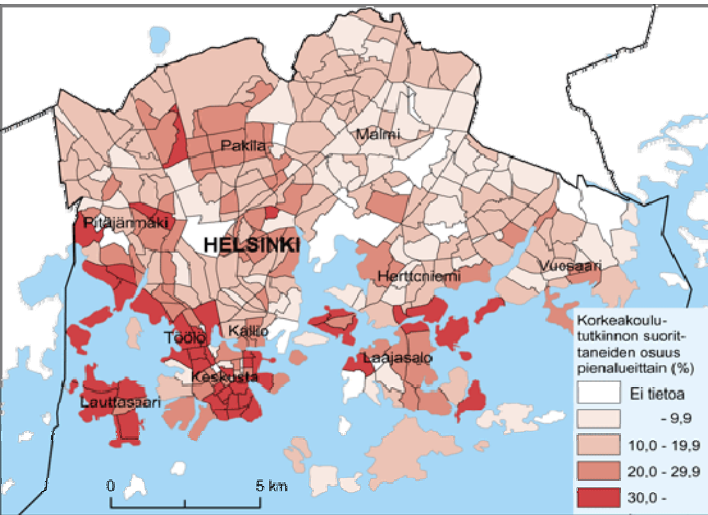
Maailma - Earth - Suomi: TK, Huoltosuhteet väestö- ja kansantaloustilastiet - SC, Indrivärdshöften, befolknings- och ekonomiska statistik - SE, Regional Statistics, demographic and economic Statistics

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Thematic Maps



Statistics Finland - Inspire data - Microsoft Internet Explorer - toimittaja Tilastokeskus

http://tilastokeskus.fi/tup/rajapintapalvelut/inspire_en.html

Tiedosto Muokkaa Näytä Suosikit Työkalut Ohje

Google Haku Jaa Lisää >> Kirjautu sisään

Suosikit http--intra.stat.fi-intra-hlos... Visualising Data » Resources CIRCABC - GISCO working ... Newsletter 29-2013 Generic Statistical Informati... geoserver Welcome Ryhmä 4 Yleiskatsaus

Statistics Finland - Inspire data

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Interface services
▶ Inspire data
Additional information

Inspire data

You can find the descriptions (Metadata) for Inspire data under [Geodata search](#) in Paikkatietoikkuna. You can view the data in the [Map window](#) in Paikkatietoikkuna or download them to your application using the address links given in the data descriptions or for some datasets also with the Atom feed. The same descriptions and links can also be found in the table below.

The Inspire datasets offered by Statistics Finland are as follows:

Data descriptions in the spatial data directory	Interface services	
Statistics grid 1 km x 1 km		Atom feed (RSS)
Municipality-based statistical areas	WMS WFS	
Population by statistical area	WMS WFS	
Educational institutions	WMS WFS	
Production and industrial facilities	WMS WFS	
Population grid data 1 km x 1 km	WMS WFS	Atom feed (RSS)

[Terms of Use for the data](#)

The following shows map views from Paikkatietoikkuna containing examples of



Some practices of Geospatial coding and referencng statistics.pptx - Microsoft PowerPoint

Statistics Finland - Classifications - Microsoft Internet Explorer - toimittaja Tilastokeskus

http://tilastokeskus.fi/meta/luokitukset/index_en.html

Tiedosto Muokkaa Näytä Suosikit Työkalut Ohje

Google Haku Jaa Lisää >>

Kirjaudu sisään

Suosikit http--intra.stat.fi-intra-hlos... Visualising Data » Resources CIRCABC - GISCO working ... Newsletter 29-2013 Generic Statistical Informati... geoserver Welcome Ryhmä 4 Yleiskatsaus

Statistics Finland - Classifications

Google™ Tämä sivu on kirjoitettu kielellä englanti. Käännetäänkö sivu Google-työkalupalkin avulla? [Lisätietoja](#) Eikö kieli ole englanti? [Auta meitä parantamaan](#) [Sanakäännös](#)

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Metadata

Classifications

- Regional classifications
- Social classifications
- Economic classifications
- Other classifications

- International classifications
- Contact information

Welcome to the Internet pages of Classification Services

Statistics Finland's Classification Services maintain and publish national classification recommendations. Several of them are based on international standards confirmed by EU directives. Use of classification recommendations improves the comparability of statistical information produced at different times and in different areas.

Classifications consist of headings, or names of groups, of codes given to them, i.e. numerical or alphabetical codes, and of descriptions of groups, i.e. definitions. Classification refers to dividing individual items of information present in statistical data according to certain features into different groups where each unit belongs to only one group. In the classification the groups are named and codes are issued to them.

Classifications can be divided into four groups:

- **Regional classifications** (e.g. division into regions and major regions)
- **Social classifications** (e.g. occupation and education)
- **Economic classifications** (e.g. industry and sector)
- **Other classifications** (e.g. land use and buildings)

Statistics Finland • Telephone +358 9 17 341 • [Contact information](#) • [Copyrights and Terms of Use](#) • [Feedback](#)

Paikallinen intranet 100%

Käynnistä Tammilehto-Luo... 3 Microsoft Of... 4 Resurssienh... Organisation - S... 5 Microsoft Of... Statistics Finla... 15:23

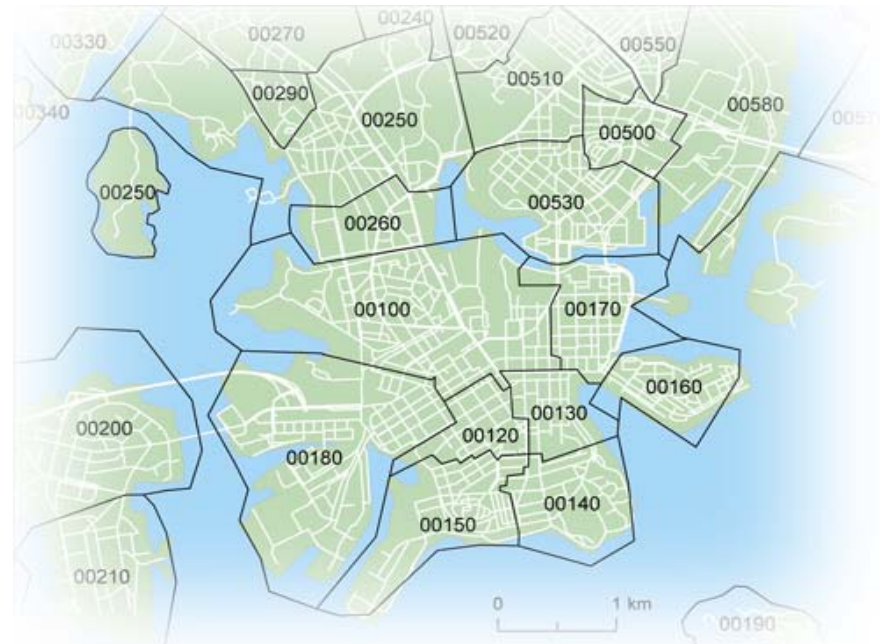
Geospatial information

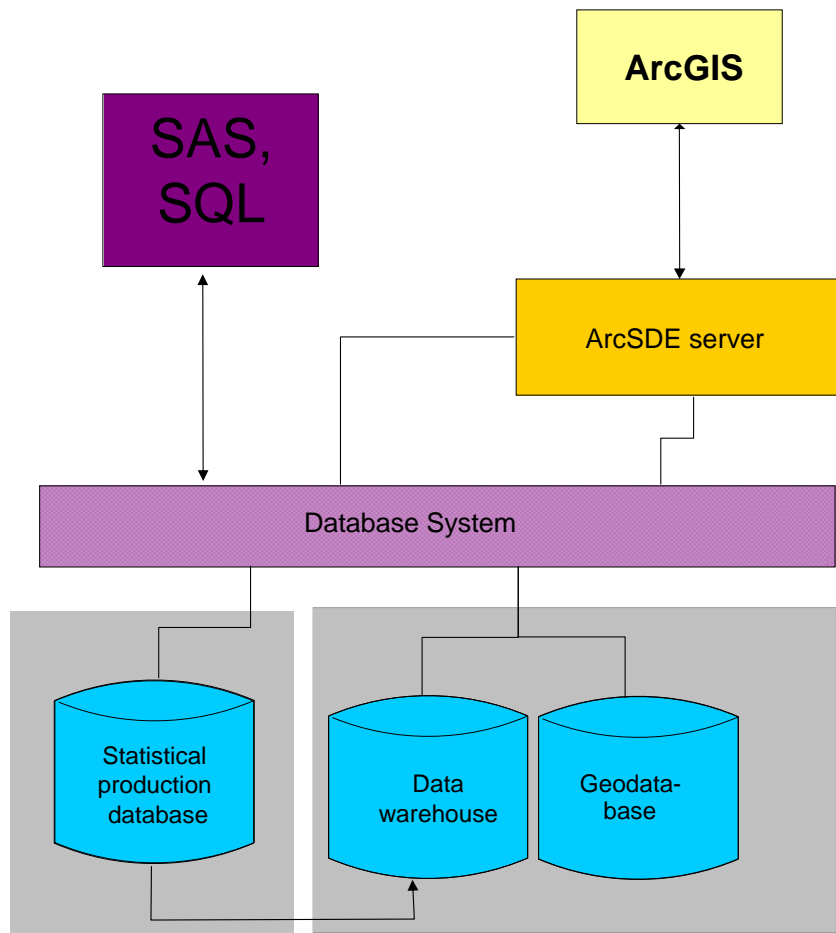
- Indirect georeferences

NUTS_3	LAU1_NAT_CODE	LAU_2_NAT_CODE	NAME_1	NAME_2_LAT
F1131	101	097	Hivensalmi	Hivensalmi
F1131	101	213	Kangasniemi	Kangasniemi
F1131	101	491	Mikkeli	S:t Michel
F1131	101	507	Mäntyharju	Mäntyharju
F1131	101	588	Pertunmaa	Pertunmaa
F1131	101	623	Puumala	Puumala
F1131	101	696	Ristiina	Ristiina
F1131	103	046	Enonkoski	Enonkoski
F1131	103	090	Heinävesi	Heinävesi

- Direct georeferences

(Boundaries of
NUTS-regions, municipalities , postal
code areas , grids...)





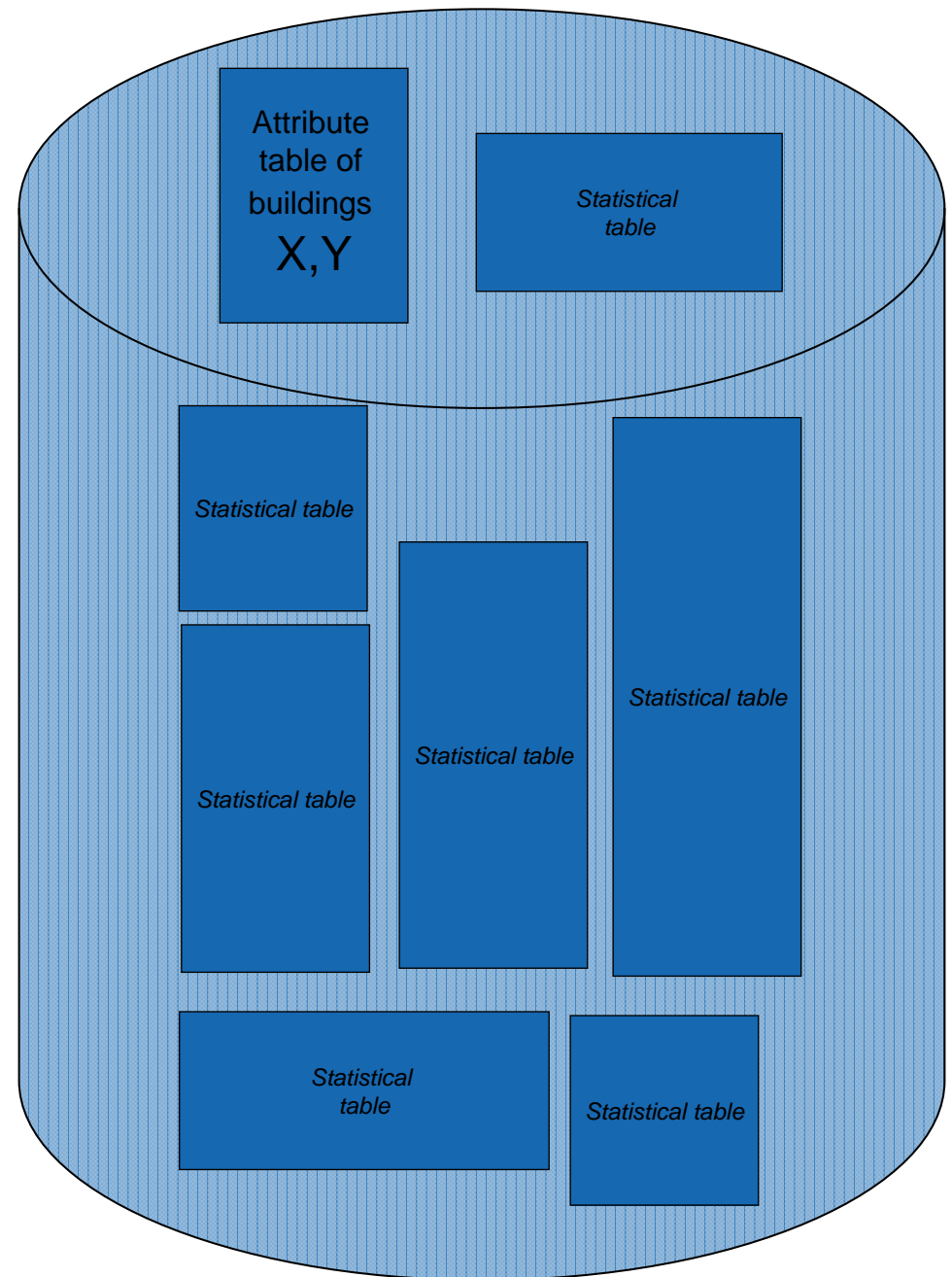
Spatial statistics production environment

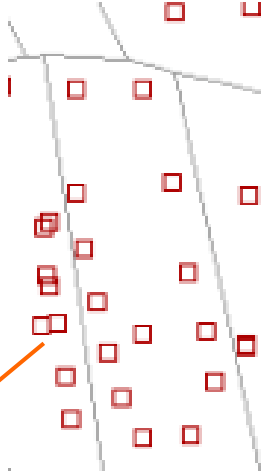
- Database; SQL Server database
- Data compilation; with e.g. SAS or SQL
- Spatiality; ESRI ArcSDE



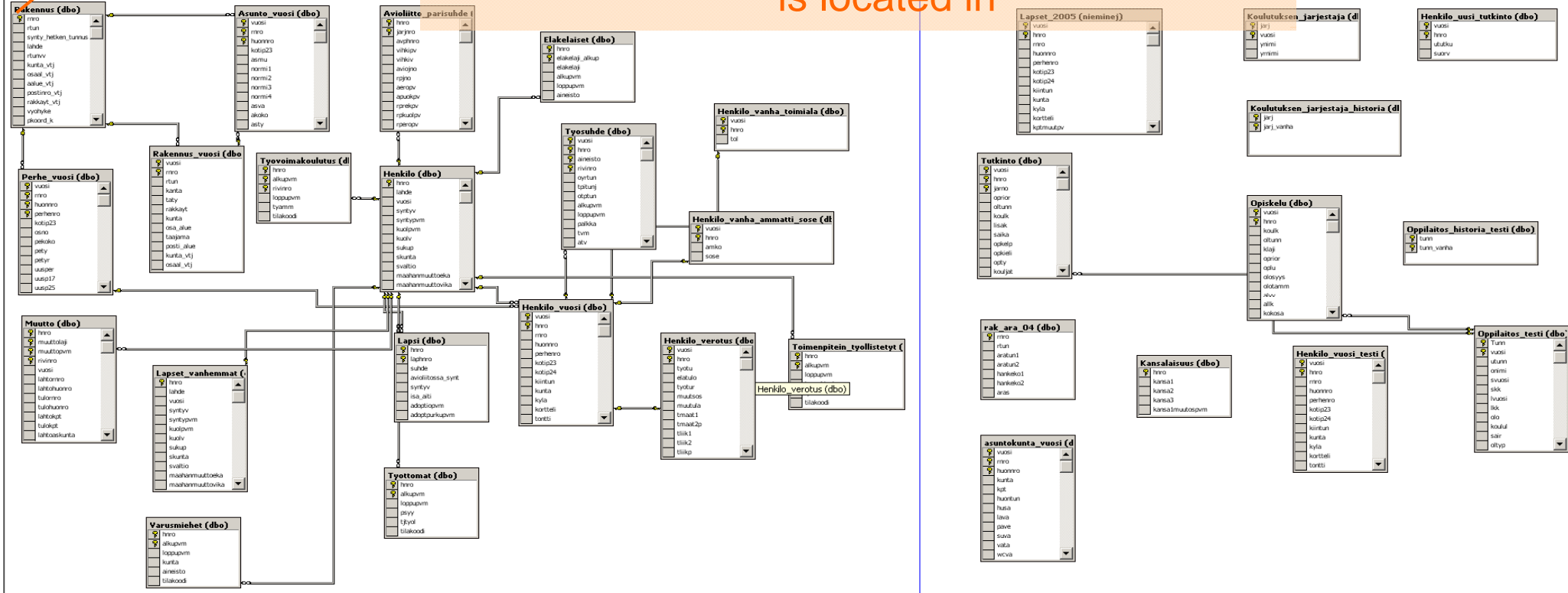
Spatiality of single unit data in the data warehouse

- Spatial information *only once* in the statistical production database as well in the data warehouse

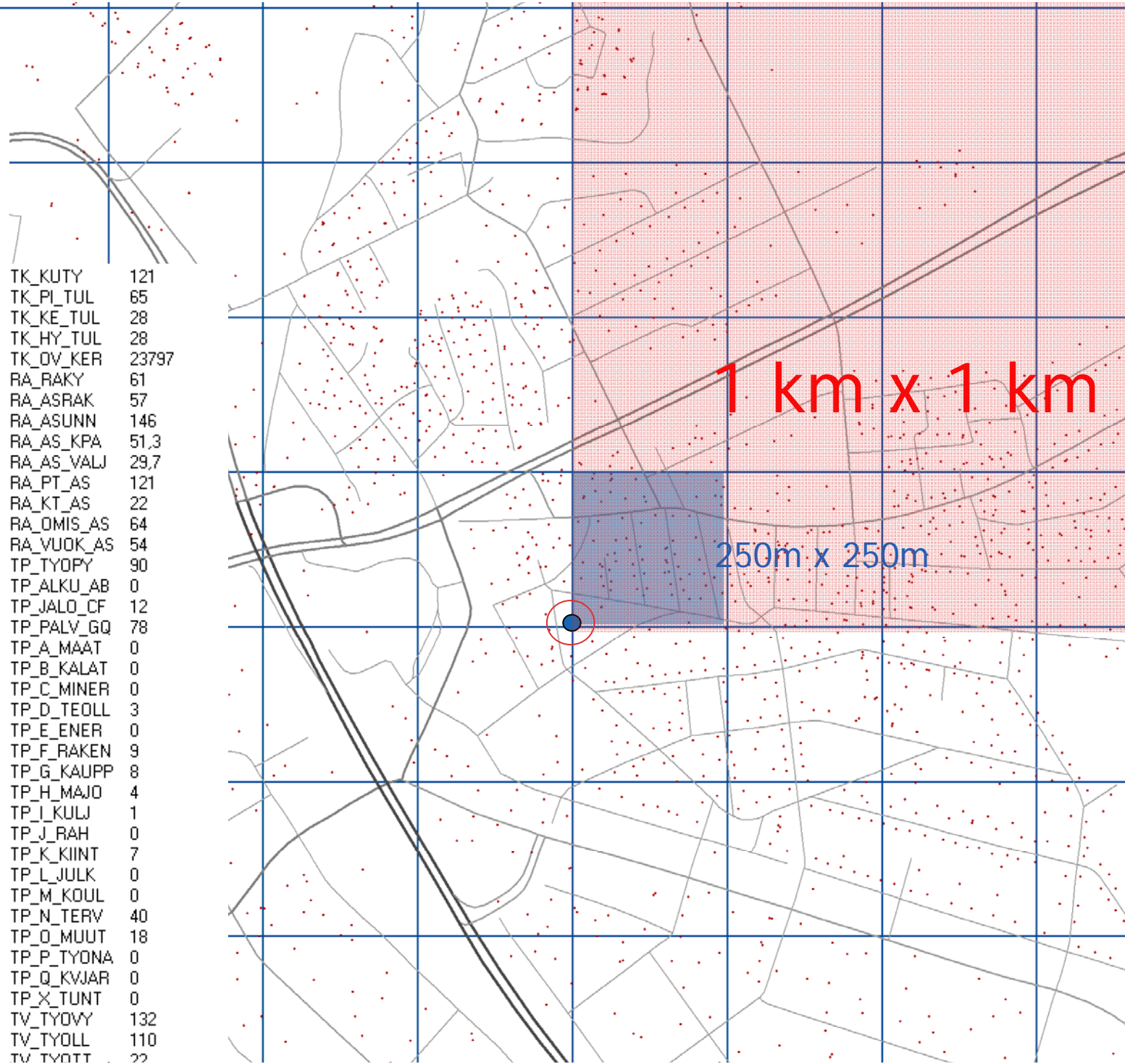


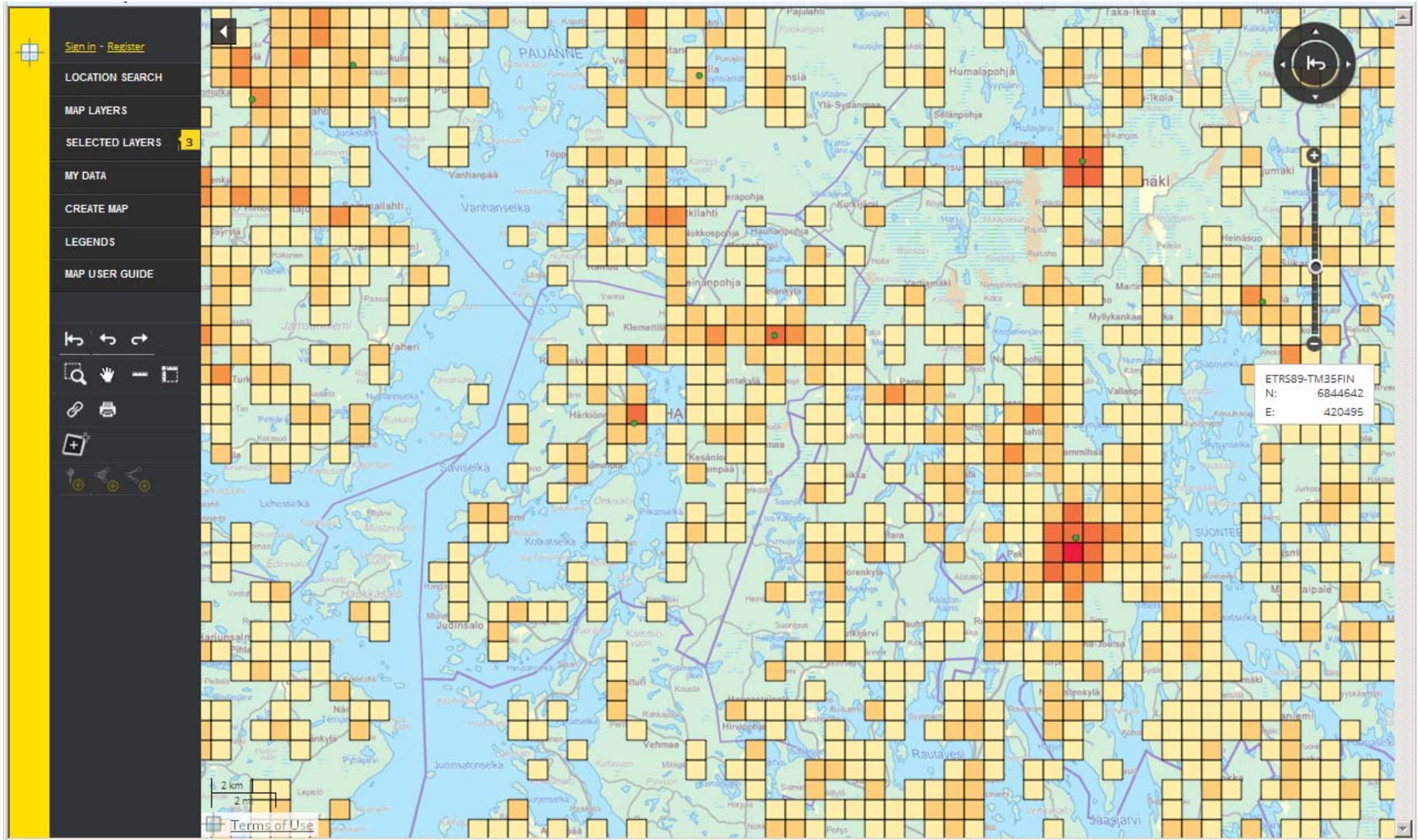


Building table -
 key to the location of buildings
 - co-ordinates of buildings
 - ID of territorial units or the grid cell the building is located in



FID	1198	
Shape	Polygon	
XKOORD		
YKOORD		
KUNTA		
ID_NRO		
HE_VAKIY	232	
HE_NAISET	107	
HE_MIEHET	125	
HE_KIKA	40	
HE_VAU VAT	3	
HE_LEIKK_I	8	TK_KUTY 121
HE_ALLEK_I	11	TK_PI_TUL 65
HE_ALAAS_I	12	TK_KE_TUL 28
HE_TEINI_I	8	TK_HY_TUL 28
HE_LAPSET	31	TK_OV_KER 23797
HE_NUORET	25	RA_RAKY 61
HE_VAK_IKA	50	RA_ASRAK 57
HE_VAKIINT	31	RA_ASUNN 146
HE_KESK_I	34	RA_AS_KPA 51,3
HE_VARTN	61	RA_AS_VALJ 29,7
HE_AKTV_I	179	RA_PT_AS 121
HE_ELAK_E_I	22	RA_KT_AS 22
HE_VANH_I	13	RA_OMIS_AS 64
KO_IKA18Y	212	RA_VUOK_AS 54
KO_PERUS	71	TP_TYOPY 90
KO_KOUL	141	TP_ALKU_AB 0
KO_YLIOP	31	TP_JALO_CF 12
KO_AMMAT	72	TP_PALV_GQ 78
KO_KORK	38	TP_A_MAAT 0
HK_KTU	19012	TP_B_KALAT 0
HK_MTU	14865	TP_C_MINER 0
HK_TUY	209	TP_D_TEOLL 3
HK_PI_TUL	96	TP_E_ENER 0
HK_KE_TUL	56	TP_F_RAKEN 9
HK_HY_TUL	57	TP_G_KAUPP 8
HK_OV_KER	3015429	TP_H_MAJD 4
TE_TALY	121	TP_I_KULJ 1
TE_TAKKOKO	1,9	TP_J_RAH 0
TE_NUOR	35	TP_K_KIINT 7
TE_EIL_NP	11	TP_L_JULK 0
TE_LAPS	14	TP_M_KOUL 0
TE_PLAP	2	TP_N_TERV 40
TE_AKLAP	6	TP_O_MUUT 18
TE_KLAP	10	TP_P_TYONA 0
TE_TEINI	6	TP_Q_KVJAR 0
TE_AIK	98	TP_X_TUNT 0
TE_ELAK	9	TV_TYOVY 132
TK_KTU	31485	TV_TYOLL 110
TK_MTU	22651	TV_TYOTT 22





File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:138 770



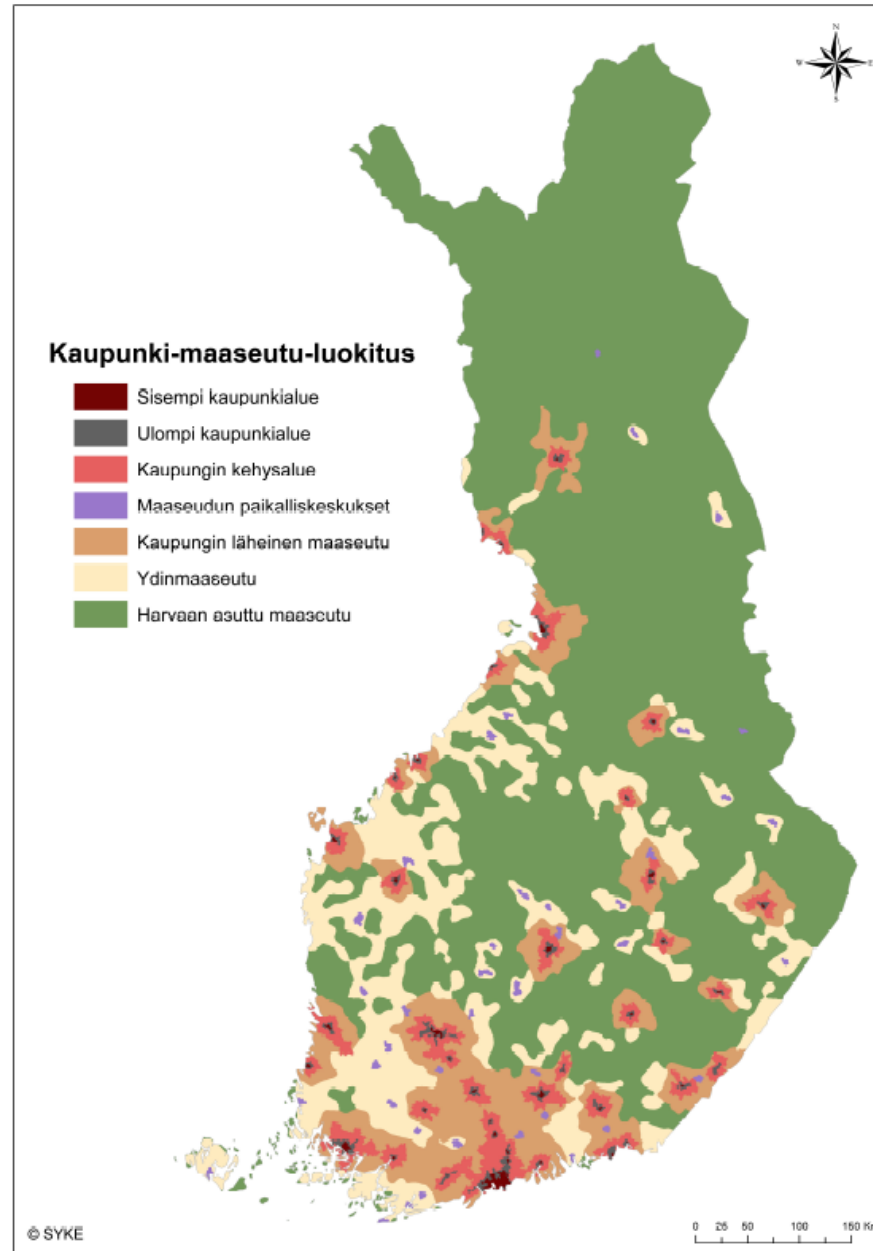
Layers	
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<input checked="" type="checkbox"/>	vaki2010_1km_shp
<input checked="" type="checkbox"/>	MML:n Rasteriaineistojen palvelurajapinta (WMS)





Statistics Finland

New urban-rural typology based on grid data



Point based geospatial statistical framework

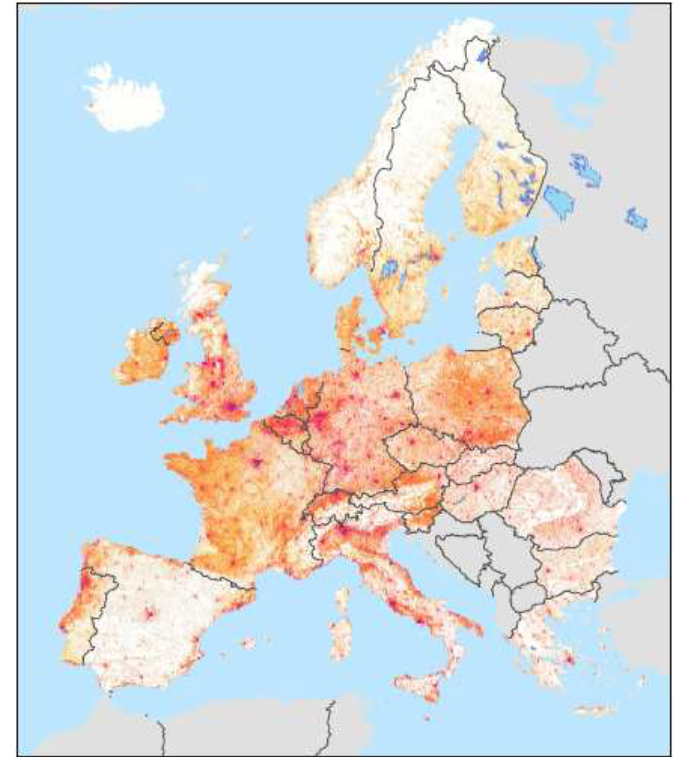
- Strongly recommended by [GEOSTAT](#) –project and [EFGS](#)
- Points/Grids do not change (space, time)
- Grids comparable inside a country and between countries
- Grid net for harmonising statistics by different kinds of territorial units – “Location the unifying factor”
- Grids as a basic unit for compiling statistics flexibly by small to larger areas, by natural boundaries, by distances...
- Grids for comparable functional areas (e.g. urban-rural)
- Grids for spatial analysis (accessibility, neighborhood...)

National and European cooperation

- National Advisory Committee on Information Management in Public Administration (JUHTA) – standards and recommendations
- The National Council for Geographic Information – NSDI, National Spatial Data Strategy
- [European Forum for Geostatistics](#)
- [ESSnet project Geostat](#)
- [Inspire](#)

ESSnet GEOSTAT

- Harmonised population grid data (1km x 1km grid cells) of 2006, 2011
- Guidelines to produce population grid data
- Examples of the use of grid data
- European Forum for Geostatistics <http://www.efgs.info/>



INSPIRE (Infrastructure for Spatial Information in Europe)

- The Finnish Geoportal (CSW, WMS, WFS) by the National Land Survey (today > 500 map layers by 50 data providers <http://www.paikkatietoikkuna.fi/web/en/map-window>)
- SF's data available according to Inspire specifications since May 2013 (24 data layers)

Statistical units (Major regions, sub-regional units, municipalities, 1km x 1km grids...)

Population by statistical units (total, sex, age) incl. grids!

Educational institutions

Production and Industrial Facilities

<http://tilastokeskus.fi/tup/rajapintapalvelut/index.html>

Geospatial information at Statistics Finland

- Data warehouse with Geodatabase
- Register-based population data with links to geocoded buildings – dwellings, places of work, educational institutions, production and industrial facilities
- Small area statistics; by postal code area, municipal sub-area, grid (1km x 1km , 250m x 250m)
- Products and web services
- New developments
 - WMS, WFS services
 - Accessibility studies
 - Urban-rural classification independent of administrative boundaries

Challenges

- Confidential information on geospatial statistics
Small area statistics and data protection
small areas with few inhabitants, integration with detailed background maps...
- Budget constrains on development of data bases and new statistics
- Open data until now only statistics by administrative area free of charge in Finland
- To make the most of geospatial information also mobile data
- Understanding of the importance of harmonised spatial information – integration of statistics and geospatial information



EUROPEAN FORUM FOR GEOSTATISTICS
SOFIA CONFERENCE 2013
 23-25 October, Sofia, Bulgaria
"The Proof Of The Apple Is In The Eating!"



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Welcome to the European Forum for Geostatistics 2013 Conference website!

[European Forum for Geostatistics](#)

The European Forum for Geostatistics (EFGS) represents a professional network of experts contributing within the framework of the European Statistical System to creating a common geostatistical data infrastructure and to the best practices in collecting, producing and disseminating georeferenced statistics.

[Sofia conference 2013](#)

Motto:
 "The proof of the apple is in the eating"

Focus
 Spatial Statistics from different data sources (census, registers, surveys, mobile telephones etc.) with...

- Focus 1 on users and their real data needs;
- Focus 2 on datasets to serve spatial statistics;
- Focus 3 on production processes to produce and refine spatial statistics.

Deadlines:

Registration	Start	7 th of June 2013	End	30 th of September 2013
Submitting Abstracts	Start	24 th of June 2013	End	20 th of September 2013

Thank you for your attention!