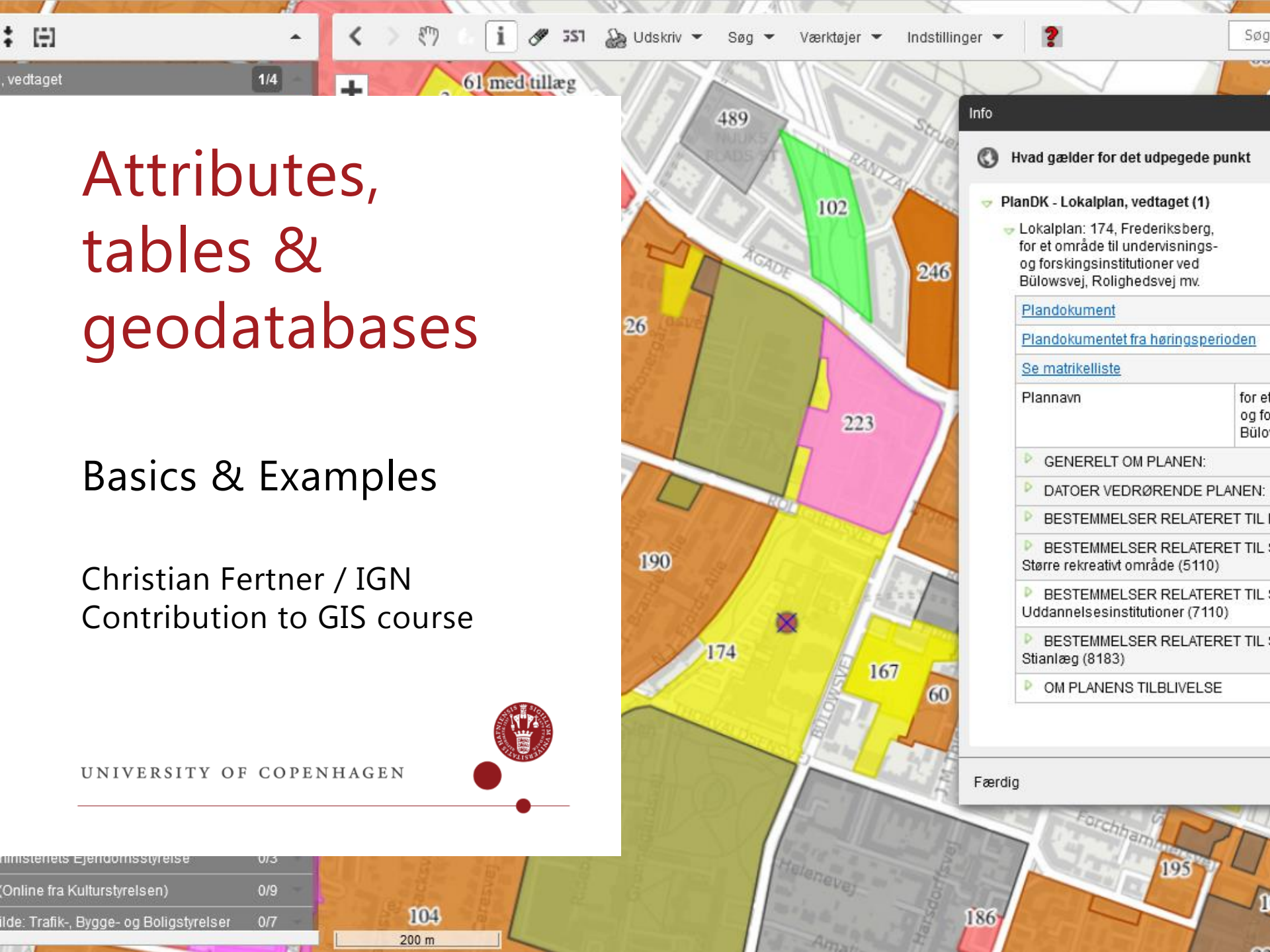


Attributes, tables & geodatabases

Basics & Examples

Christian Fertner / IGN
Contribution to GIS course

UNIVERSITY OF COPENHAGEN

Christian Fertner
Associate prof. in urban planning
IGN / Landscape Architecture and Planning

// Teaching in "Byplan Studio" (Urban planning studio)

// Research in spatial planning, sustainable urban development, resource & energy efficient cities, land use change, urban sprawl, functional regions, small towns, digital planning

// GIS as a tool to organize, analyse and illustrate spatial information.

some examples how I use GIS in the end

Attributes, tables & geodatabases

- What does a geographic outline represent?
  - Some you can answer from the context (e.g. orthophoto) or from adding other data (e.g. street network)
  - Some is described in attributes (given and calculated) or joined data (e.g. population added to district)

- **Attribute** – information/data enriching the actual geographical element

Geodata

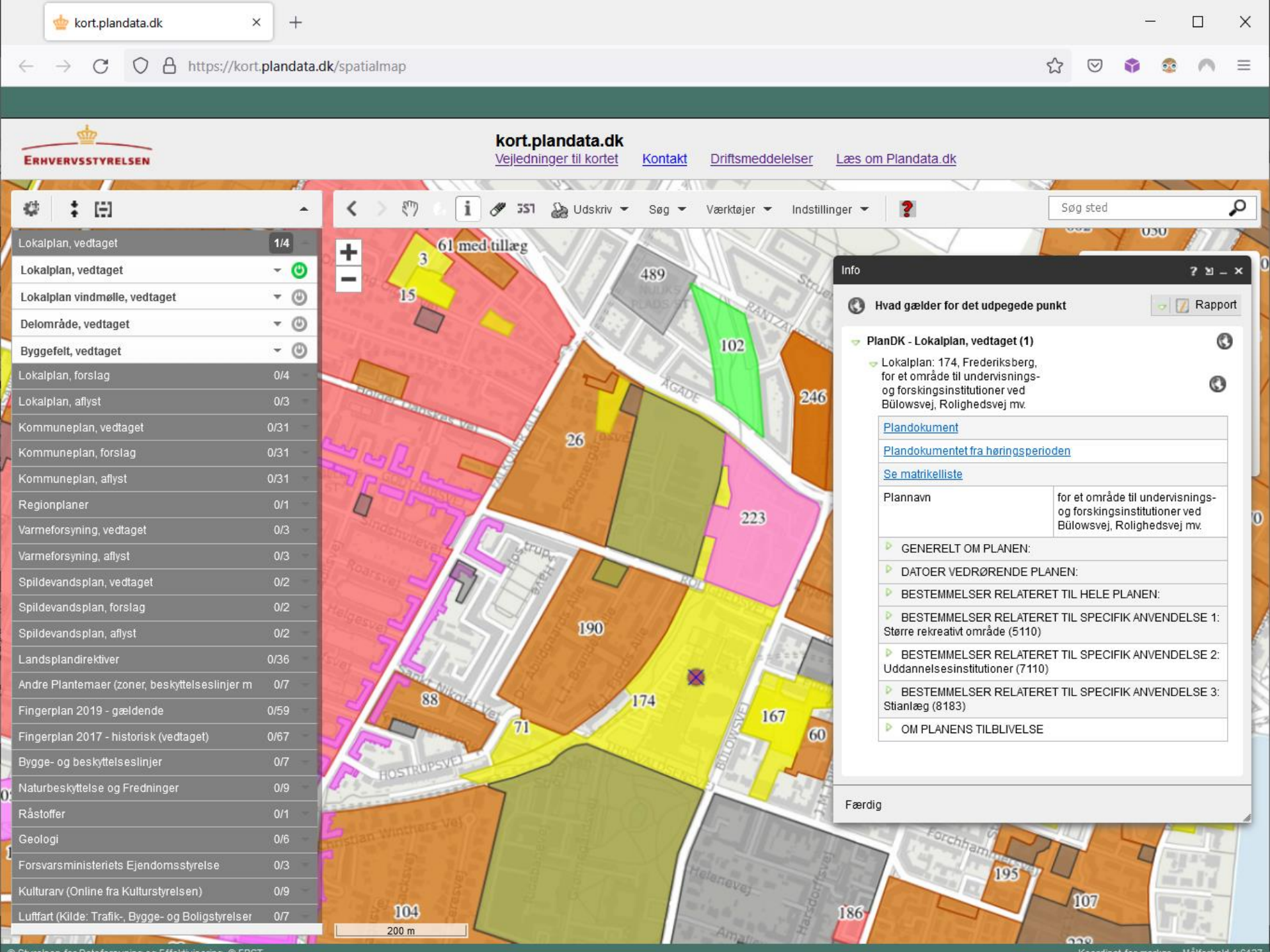
Location information

- Point, line, polygon
- Coordinate system
- Coordinates (x,y,z)
- Precision scale

+

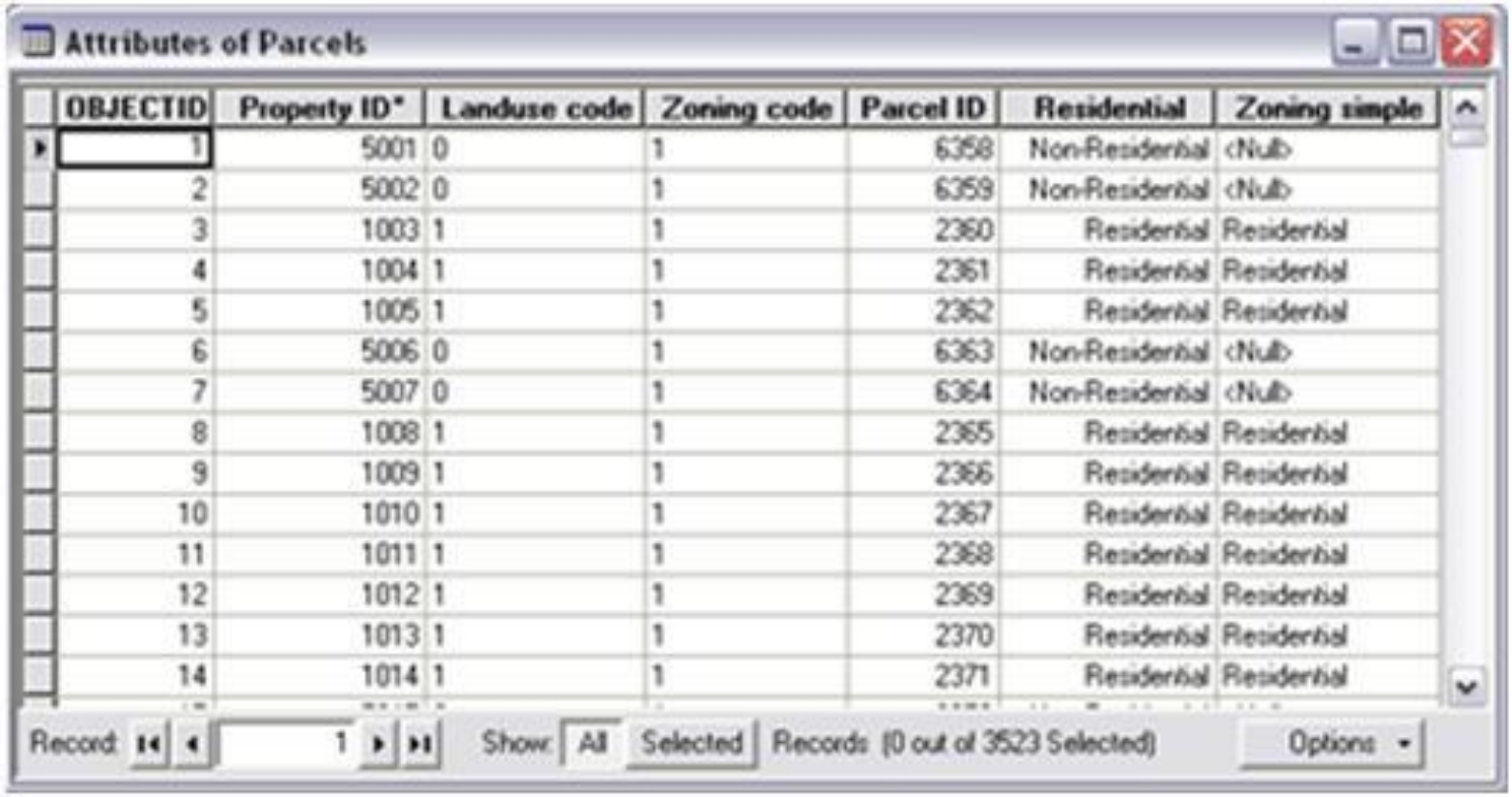
Data table

- Variables (fields)
- Main data types:
  - Text (string)
  - Number (integer, double)
  - Date/time


kort.plandata.dk
https://kort.plandata.dk/spatialmap
ERHVERVSSTYRELSEN
kort.plandata.dk
Vejledninger til kortet
Kontakt
Driftsmeddelelser
Læs om Plandata.dk
Udskriv
Søg
Værktøjer
Indstillinger
Søg sted
Lokalplan, vedtaget 1/4
Lokalplan, vedtaget
Lokalplan vindmølle, vedtaget
Delområde, vedtaget
Byggefelt, vedtaget
Lokalplan, forslag 0/4
Lokalplan, aflyst 0/3
Kommuneplan, vedtaget 0/31
Kommuneplan, forslag 0/31
Kommuneplan, aflyst 0/31
Regionplaner 0/1
Varmeforsyning, vedtaget 0/3
Varmeforsyning, aflyst 0/3
Spildevandsplan, vedtaget 0/2
Spildevandsplan, forslag 0/2
Spildevandsplan, aflyst 0/2
Landsplandirektiver 0/36
Andre Plantemaer (zoner, beskyttelseslinjer m 0/7
Fingerplan 2019 - gældende 0/59
Fingerplan 2017 - historisk (vedtaget) 0/67
Bygge- og beskyttelseslinjer 0/7
Naturbeskyttelse og Fredninger 0/9
Råstoffer 0/1
Geologi 0/6
Forsvarsministeriets Ejendomsstyrelse 0/3
Kulturarv (Online fra Kulturstyrelsen) 0/9
Luftfart (Kilde: Trafik-, Bygge- og Boligstyrelser 0/7
61 med tillæg
3
15
489
102
246
26
223
190
174
88
71
167
60
104
186
195
107
200 m
Info
Hvad gælder for det udpegede punkt
Rapport
PlanDK - Lokalplan, vedtaget (1)
Lokalplan: 174, Frederiksberg, for et område til undervisnings- og forskingsinstitutioner ved Bülowsvej, Rolighedsvej mv.
Plandokument
Plandokumentet fra høringsperioden
Se matrikelliste
Plannavn
for et område til undervisnings- og forskingsinstitutioner ved Bülowsvej, Rolighedsvej mv.
GENERELT OM PLANEN:
DATOER VEDRØRENDE PLANEN:
BESTEMMELSER RELATERET TIL HELE PLANEN:
BESTEMMELSER RELATERET TIL SPECIFIK ANVENDELSE 1: Større rekreativt område (5110)
BESTEMMELSER RELATERET TIL SPECIFIK ANVENDELSE 2: Uddannelsesinstitutioner (7110)
BESTEMMELSER RELATERET TIL SPECIFIK ANVENDELSE 3: Stianlæg (8183)
OM PLANENS TILBLIVELSE
Færdig

Attributes, tables & geodatabases

- **Attribute table** – database or tabular file containing information about a set of geographic features



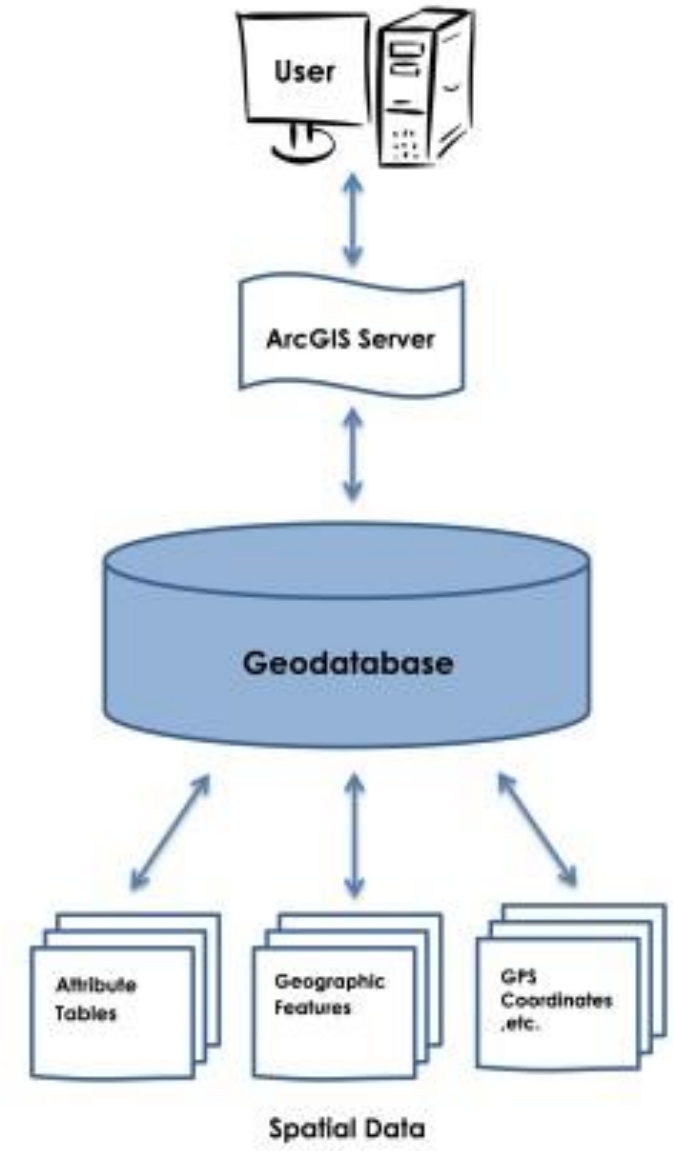
Attributes of Parcels

OBJECTID	Property ID*	Landuse code	Zoning code	Parcel ID	Residential	Zoning simple
1	5001	0	1	6358	Non-Residential	<Null>
2	5002	0	1	6359	Non-Residential	<Null>
3	1003	1	1	2360	Residential	Residential
4	1004	1	1	2361	Residential	Residential
5	1005	1	1	2362	Residential	Residential
6	5006	0	1	6363	Non-Residential	<Null>
7	5007	0	1	6364	Non-Residential	<Null>
8	1008	1	1	2365	Residential	Residential
9	1009	1	1	2366	Residential	Residential
10	1010	1	1	2367	Residential	Residential
11	1011	1	1	2368	Residential	Residential
12	1012	1	1	2369	Residential	Residential
13	1013	1	1	2370	Residential	Residential
14	1014	1	1	2371	Residential	Residential

Record: 1 Show: All Selected Records: (0 out of 3523 Selected) Options

Attributes, tables & geodatabases

- **Geodatabase** – database designed to store, query, and manipulate geographic information and spatial data



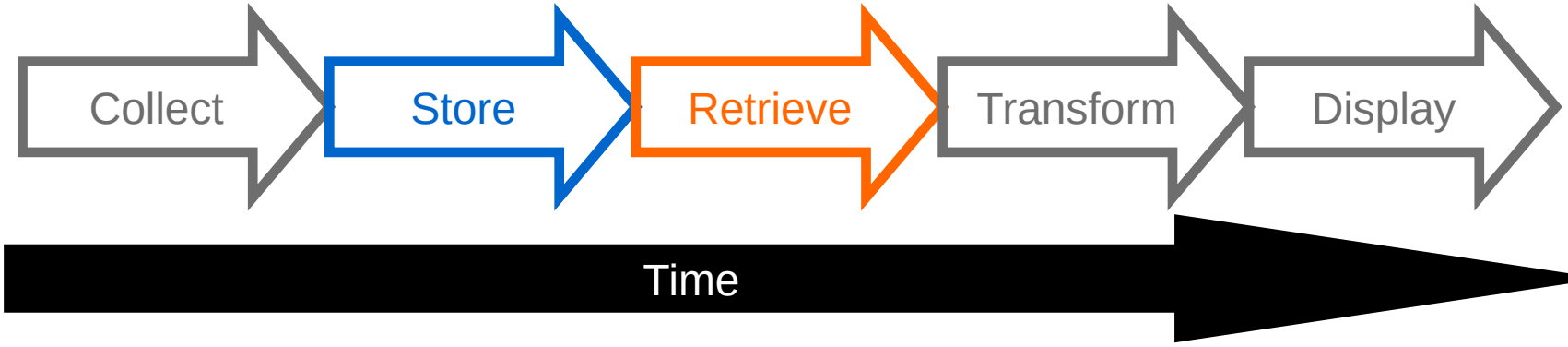
Attributes, tables & geodatabases

- **Geodatabase**
  - Opposite to basic shape file
    - One file
    - Can consist of several feature datasets and classes (that means e.g. points, lines, polygones etc.)
    - Database less limited and can be relational (e.g. field names, number of fields)
  - Central geodatabase (e.g. our 'GIS server')
    - Structure
    - Accessible to many (online, intranet...)
    - Easy to update for all – one version
    - but historical data might not be available
    - manipulation by user can be restricted
  - You can also use your own local "File Geodatabase"

Geodatabases and GIS workflow

Burrough (1986)

"A powerful set of tools
for collection, storing, retrieval, transforming and displaying
spatial data from the real world"



Why a database?

- Give structure
- Enable Search, Listing, Retrieval

"the geographic database is the framework that keeps a GIS together"

- Definition?

"A collection of structured and long-lasting data that are accessible and editable".

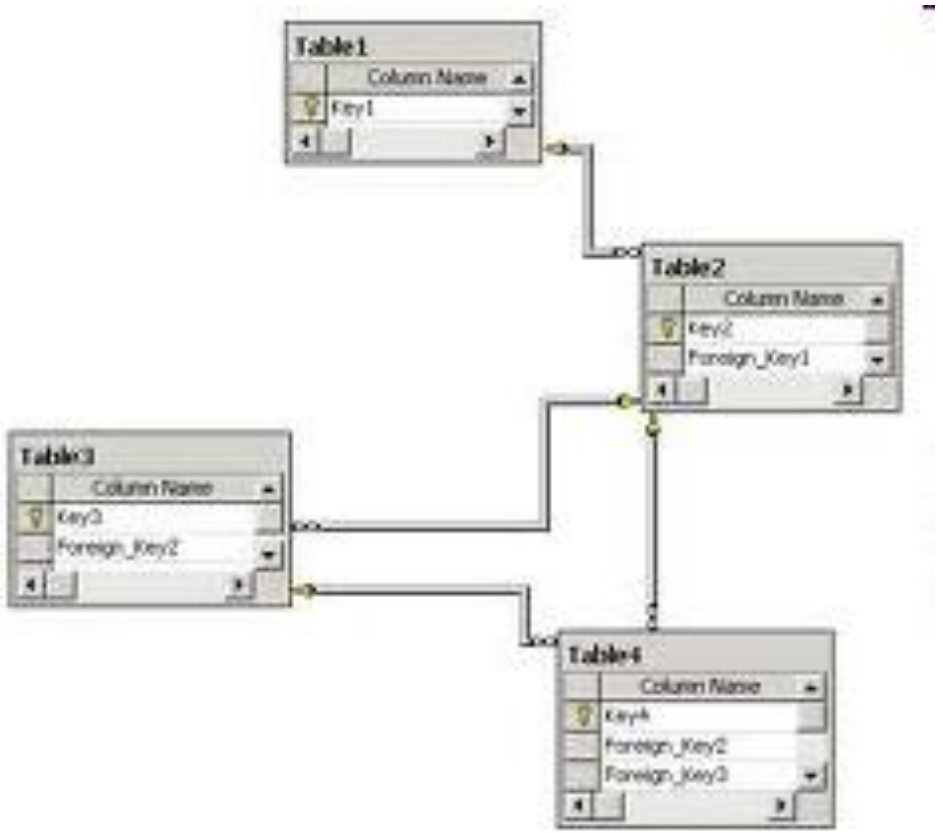
Exercise: Searching in a database with operators:

How many articles are there in Web of Science on e-bike commuting

- Data base: Web of Science
- https://www.webofscience.com/wos/woscc/basic-search
- How many results?
- How to restrict / expand the list?
- Use AND and OR operators to query

Relational Database

- Often consists of separate tables.
- Tables are related
  - may be combined
  - by a common key
- Combination = a JOIN



Relational Database

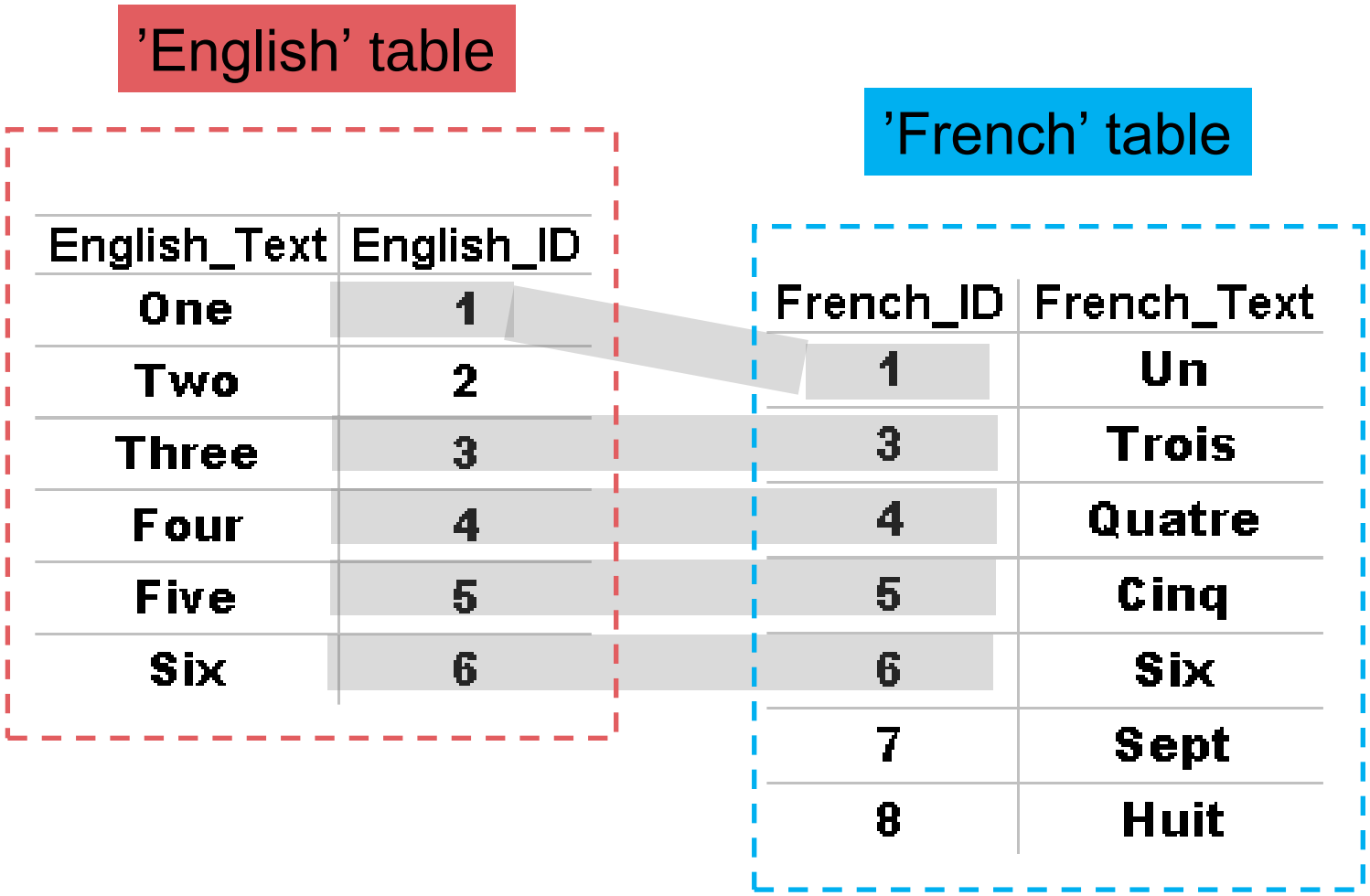
One large database:

	A	B	C	D	E	F	G	H
1	Surname	First_name	CPR_no	Address_Road	Address_no	ZIP_code	Child_Surname	Child_First_name
2	Doe	John	070375-1683	Bredgade	12	2100	Doe	Kimberley

Advantages of relational database:

- Several smaller = Faster
- Less redundancy
- Less *NULL*/empty spaces

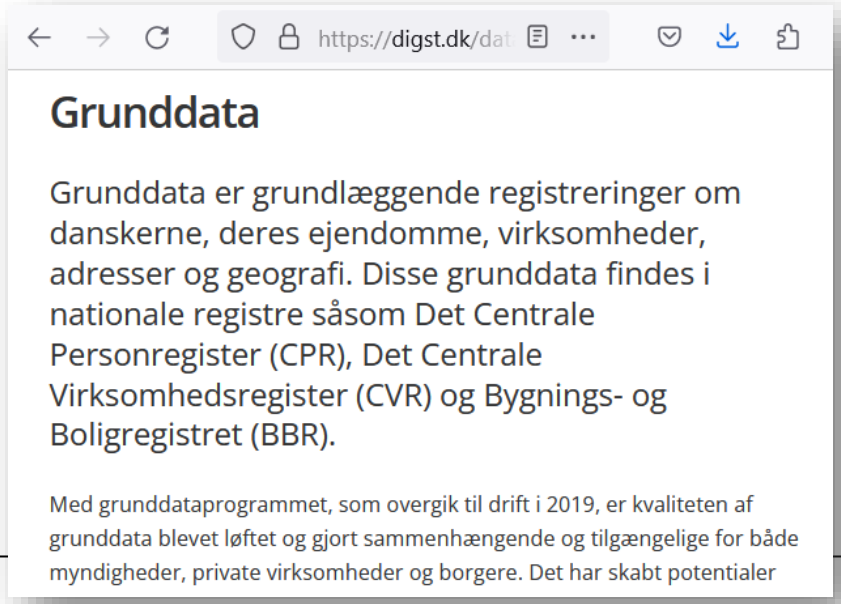
Relational Database - JOIN

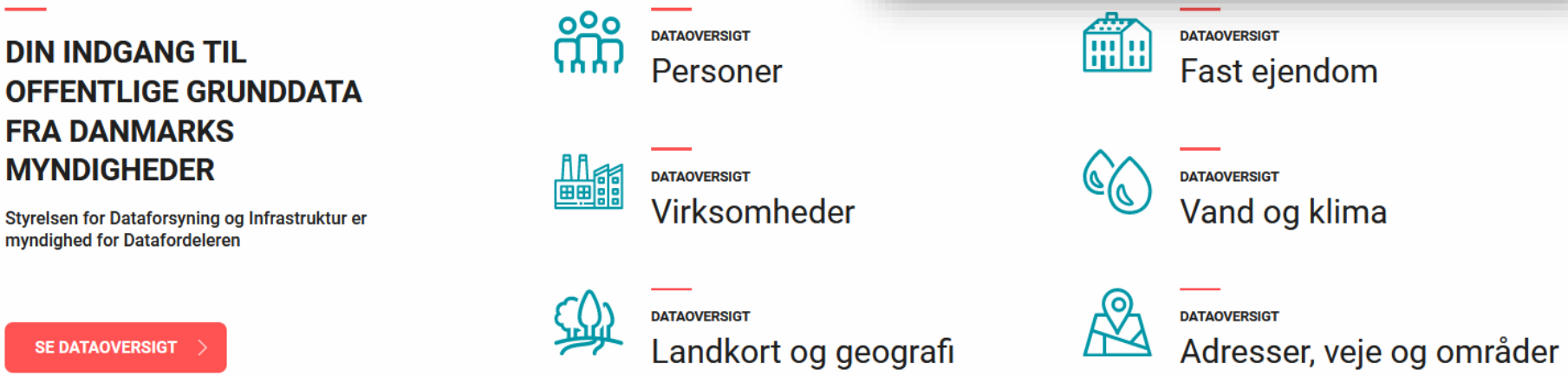


Relational databases are a central part of the Danish register-based public administration

For example

- **CPR** (Central Person register)
- **CVR** (Central Company register)
- **BBR** (Building and Housing register





Enriching your features with data

Join the attributes from a table

- Joining data from a table by IDs (e.g. population data from Statistics Denmark from municipalities to municipality polygons)

➔ **JOIN**

Join data by location (spatially)

- Joining data from other geodata (e.g. summarizing information from all building points located in a municipality polygon)

➔ **SPATIAL JOIN**

… some examples from my GIS work

Urbanisation in Europe 2000 - 2006

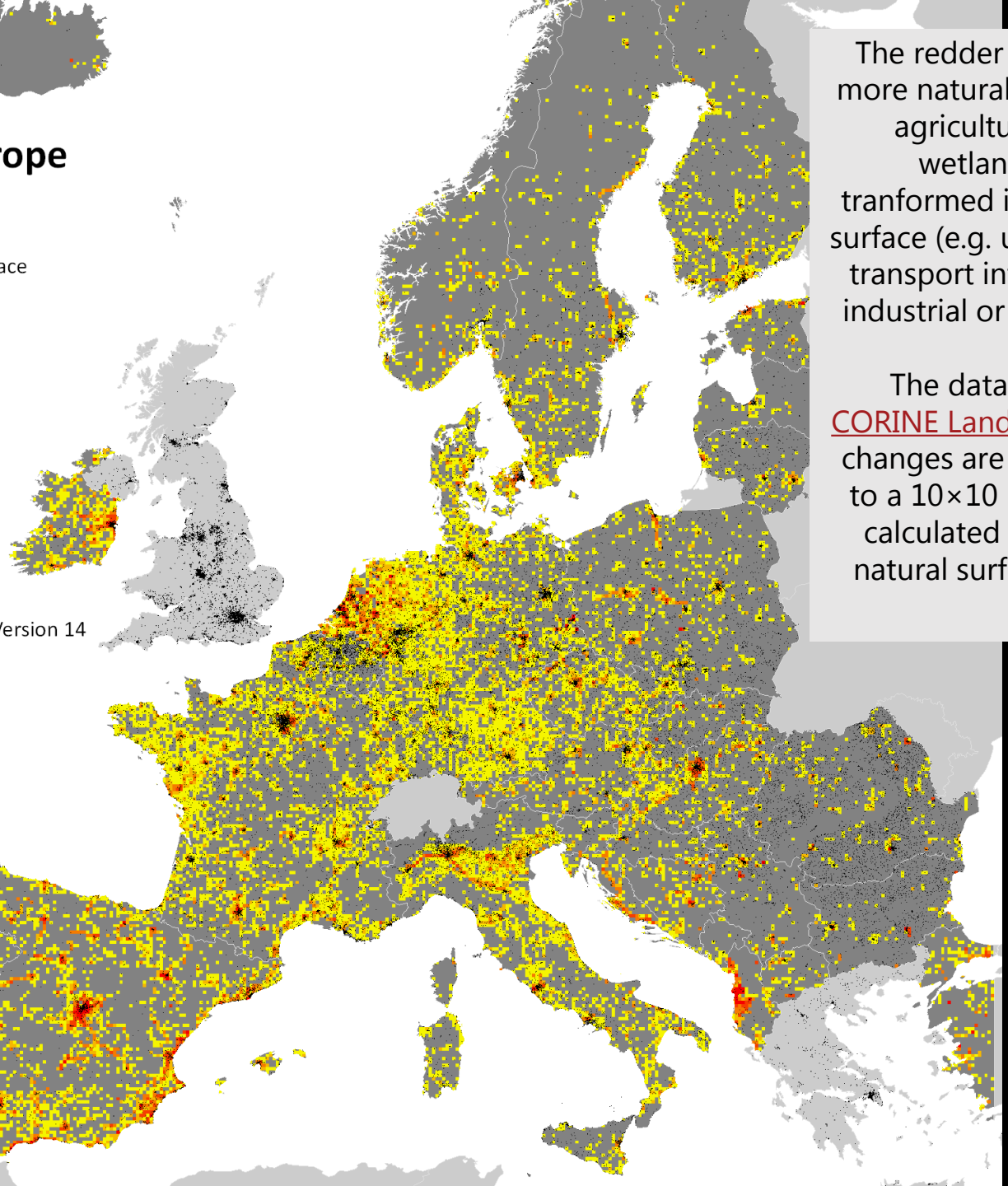
Change from natural to artificial surface area per 100 km² (10x10 km cells)

- < 0.5 km2
- 0.5 - 1 km2
- 1 - 2 km2
- 2 - 5 km2
- > 5 km2
- Urban areas 2000
- no data

Source:
EEA Corine land cover 2000 / 2006, Version 14
(UK is included from version 15)

0 125 250 500 km

Christian Fertner
University of Copenhagen
chfe@life.ku.dk
July 2011

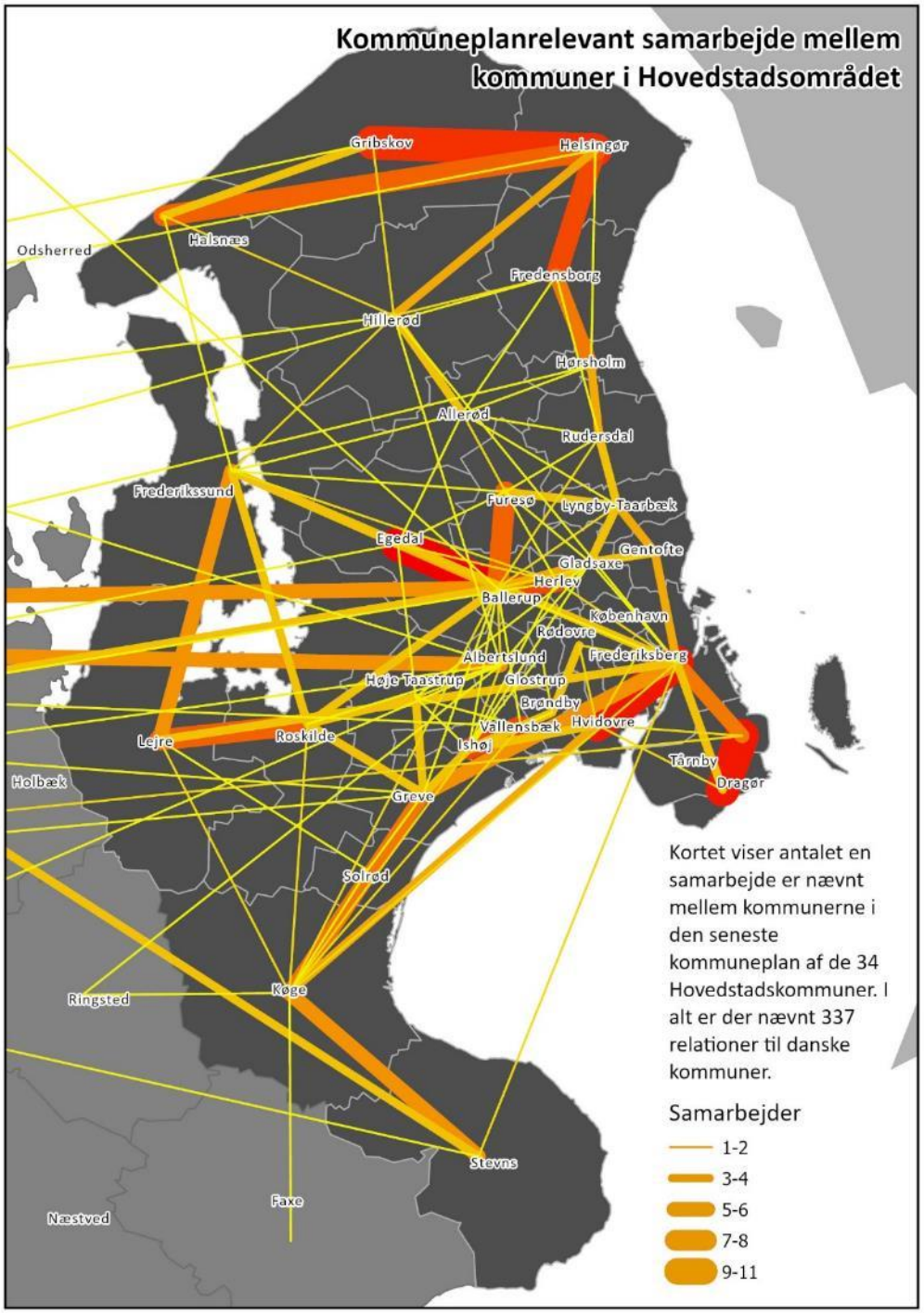


The redder an area, the more natural surface (i.e. agriculture, forest or wetlands) land got tranformed into artificial surface (e.g. urban fabric, transport infrastructure, industrial or commercial areas).
The data is based on CORINE Land cover data, changes are aggregated to a 10×10 km grid and calculated the share of natural surface that got lost.

Municipal cooperation outlined in municipal plans

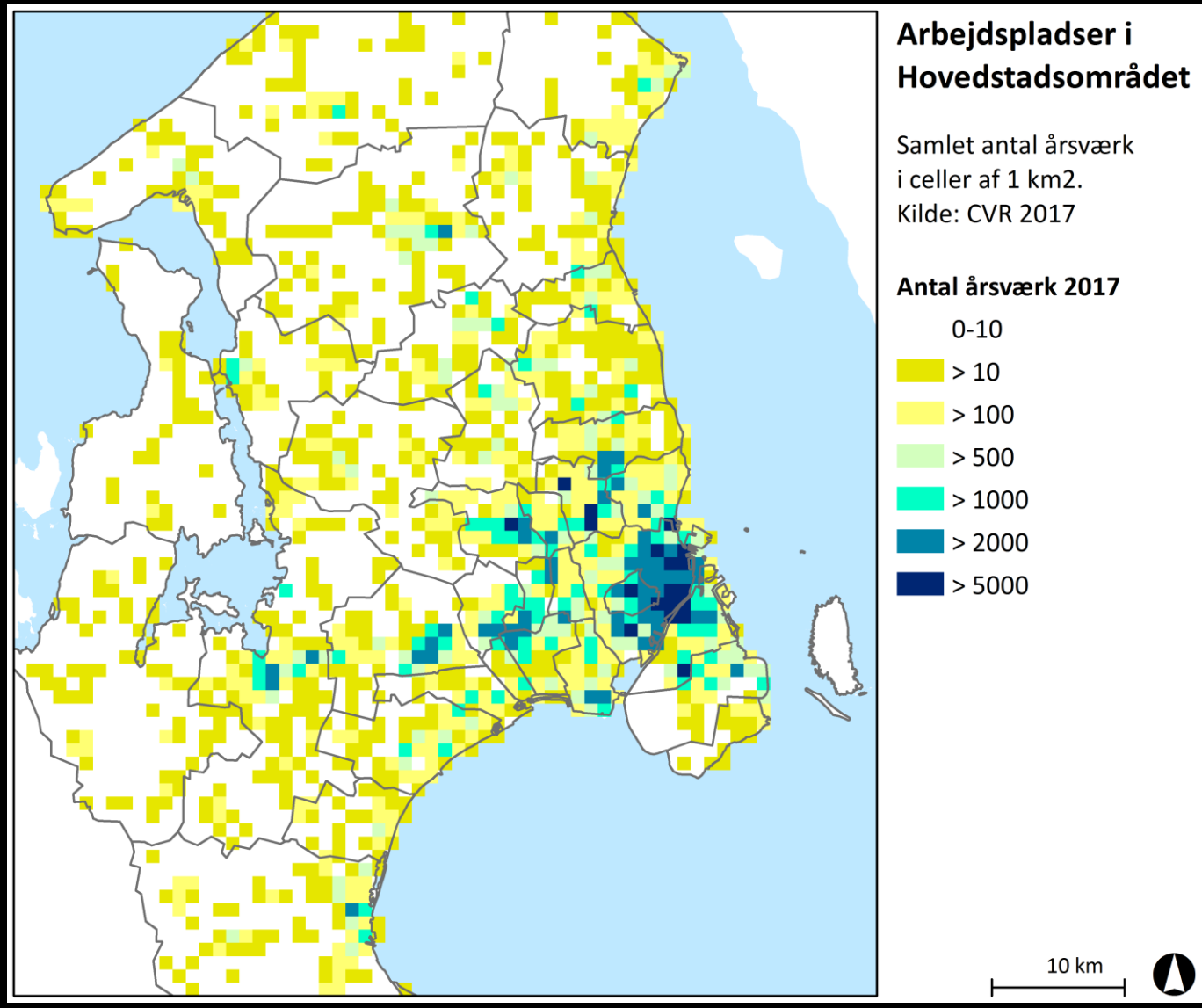
Text analysis of municipal plans in the Copenhagen region

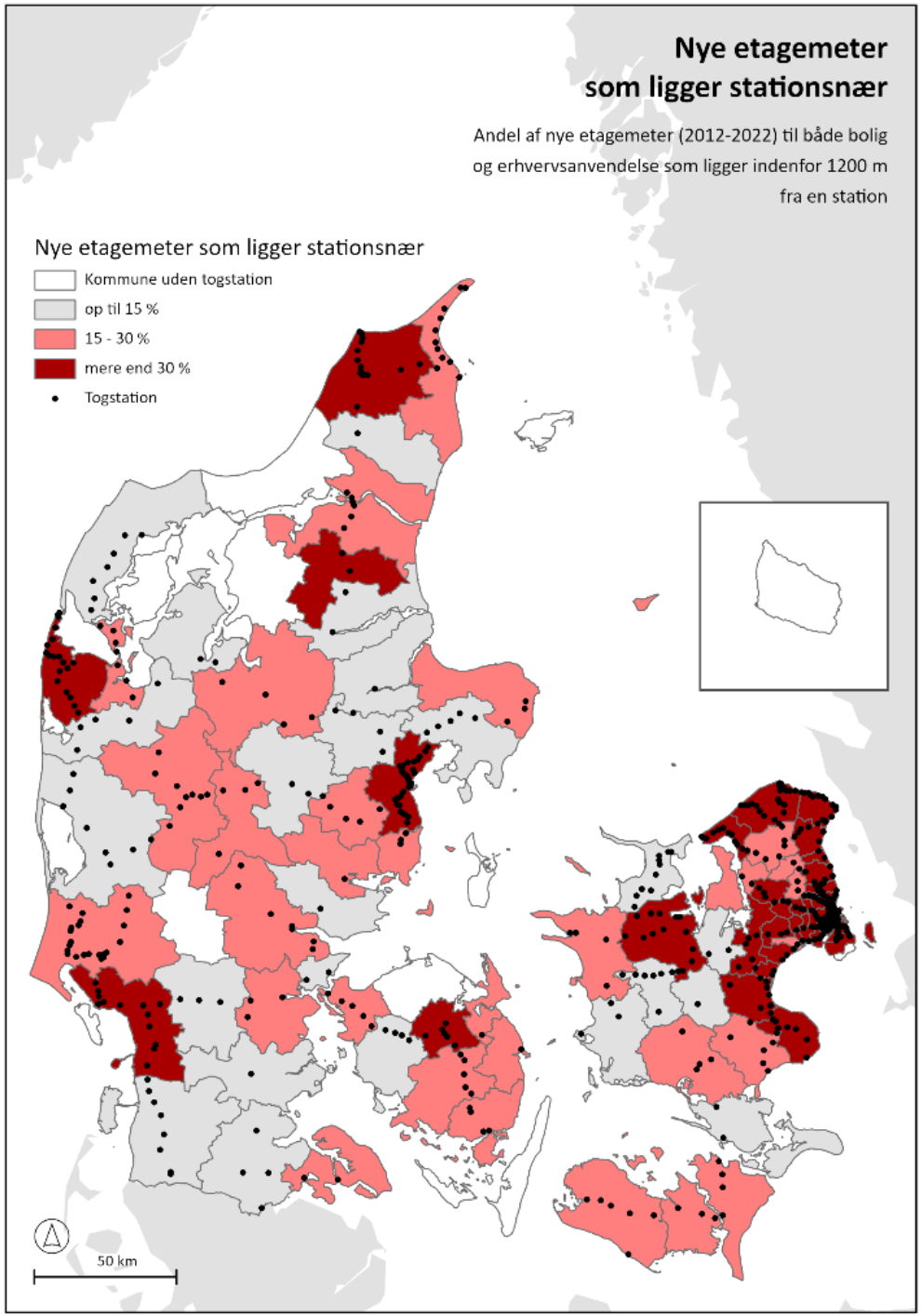
A connection is counted if the name of one other municipality is written 15 words before or after the word "samarbejd" (cooperate)



Concentration of jobs in the Copenhagen region

CVR 2017 data aggregated on 1 km2 grid

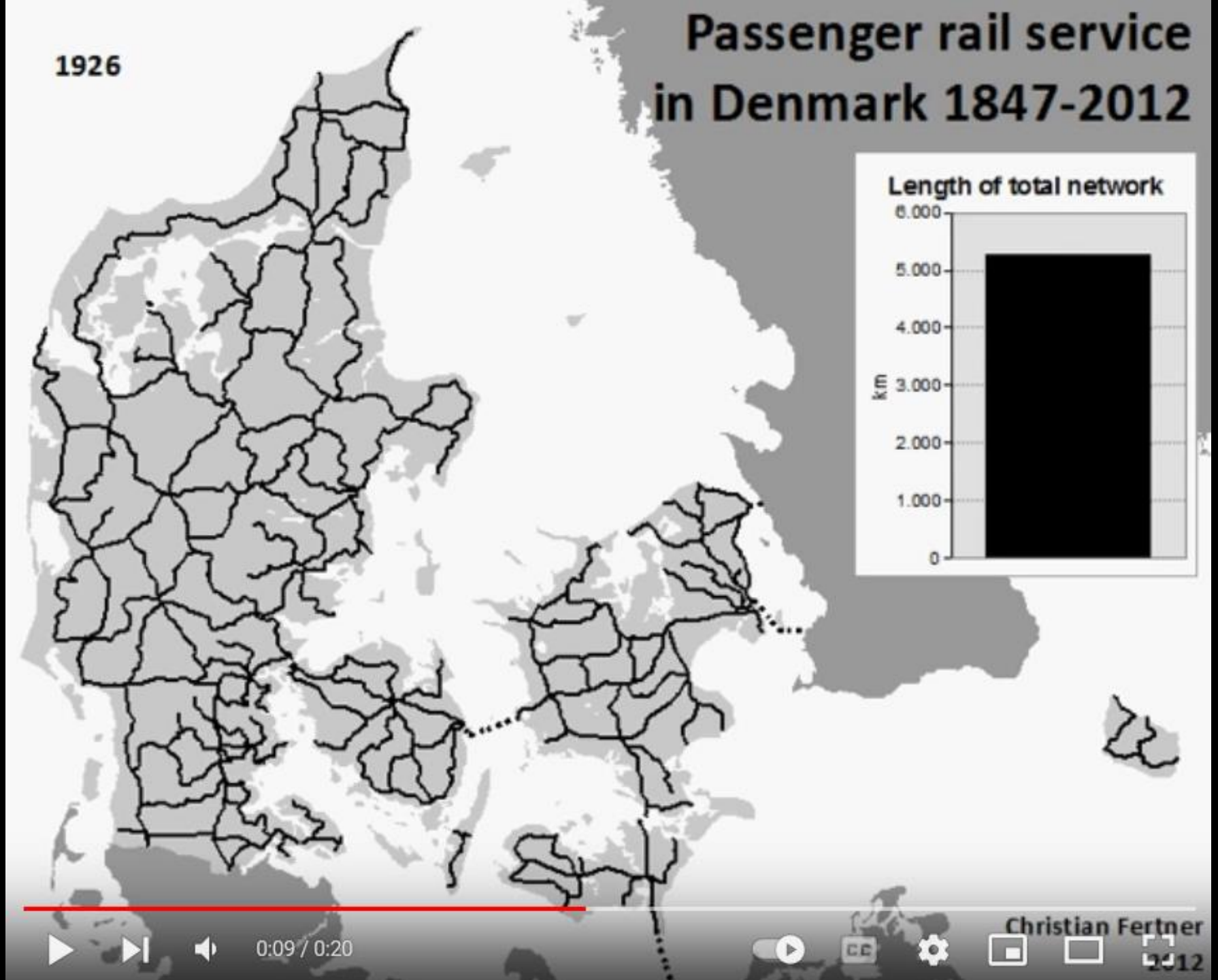


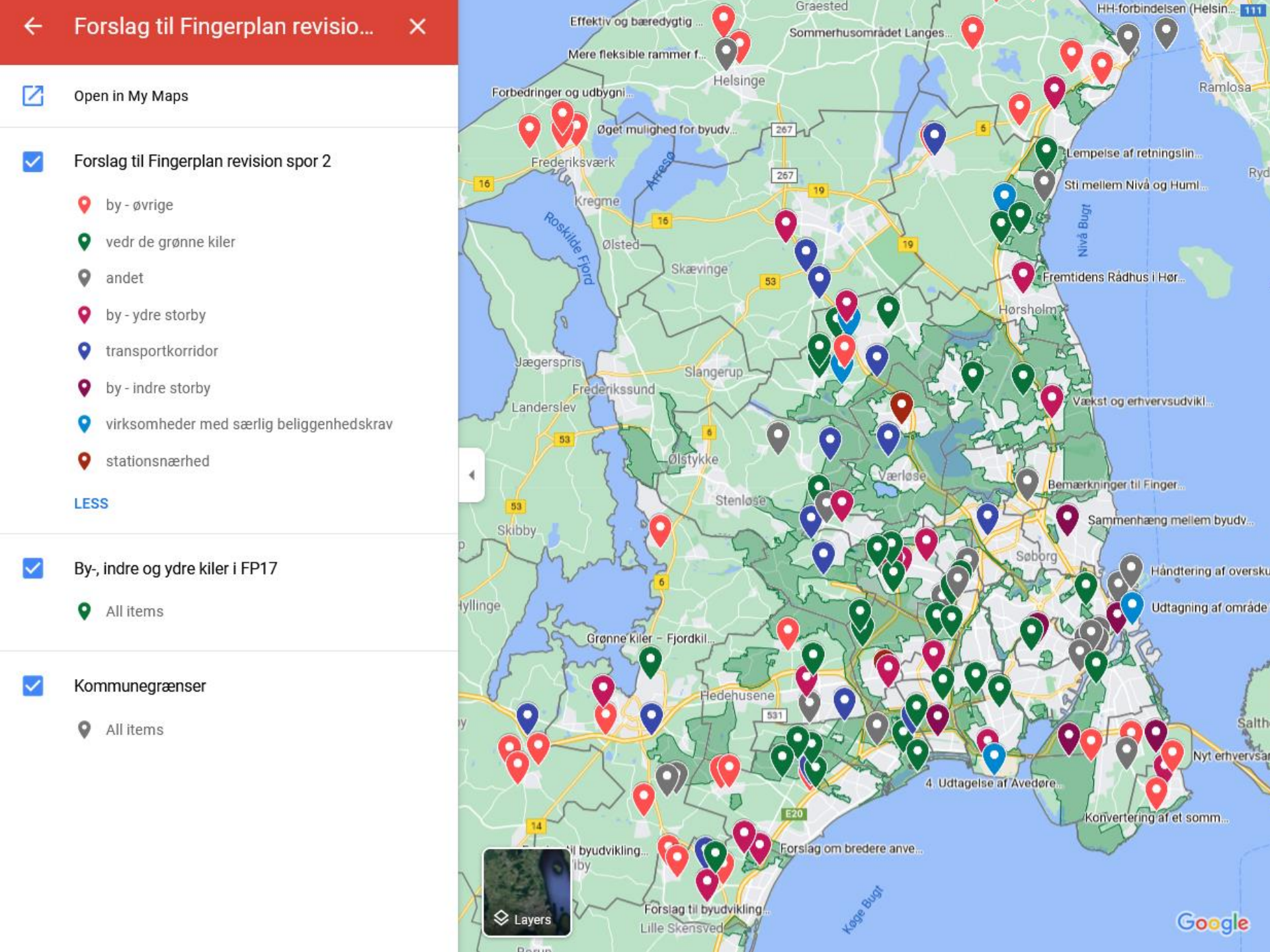


Location of new buildings in relation to railway stations

Share of floor area of buildings build between 2012 and 2022 located within 1200 m from a station, aggregated to municipalities

Data: BBR 2022, stations


1926
Passenger rail service
in Denmark 1847-2012
Length of total network
6.000
5.000
4.000
3.000
2.000
1.000
0
km
0:09 / 0:20
Christian Fertner
2012


Forslag til Fingerplan revisio...
Open in My Maps
Forslag til Fingerplan revision spor 2
by - øvrige
vedr de grønne kiler
andet
by - ydre storby
transportkorridor
by - indre storby
virksomheder med særlig beliggenhedskrav
stationsnærhed
LESS
By-, indre og ydre kiler i FP17
All items
Kommunegrænser
All items
Layers
Google

KØBENHAVNS UNIVERSITET 560 erhvervsområder

560 erhvervsområder

GIS-Analyse af omdannelsespotentiale af erhvervsrammeområder i Hovedstadsområdet

Hans Skov-Petersen & Christian Fertner, Københavns Universitet

Baggrund Variabler Standardisering & aggregering Klassifice →

[status januar 2023]

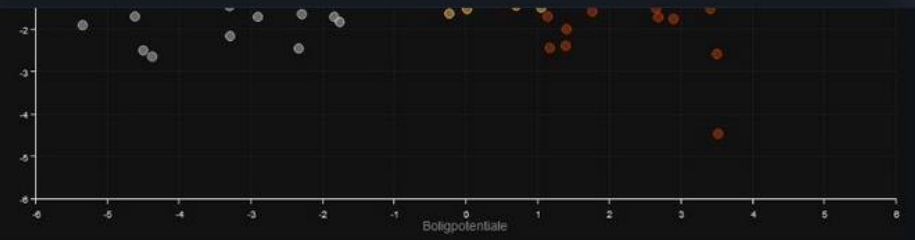
Baggrund

Der findes over 900 rammeområder for erhverv i kommuneplanerne i Hovedstadsområdet. Områderne ligger spredt over hele regionen og varier meget. Nogle områder egner sig til omdannelse til andre anvendelser som blandet eller bolig.

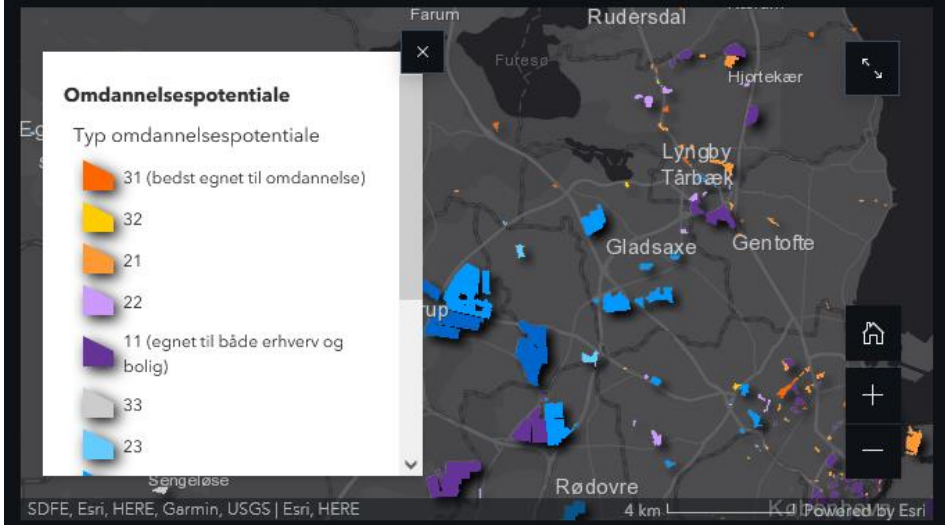
Denne analyse sammenligner lokaliseringspotentialet for erhverv og for bolig for alle rammer. Rammerne blev sammenlagt til 560 områder

KØBENHAVNS UNIVERSITET 560 erhvervsområder

← Variabler Standardisering & aggregering Klassificering Cre →



560 erhvervsområdernes erhverv- og boliglokaliseringspotentiale og illustration af 9 klasser (statisk scatter plot) **[scatter plot skal opdateres]**

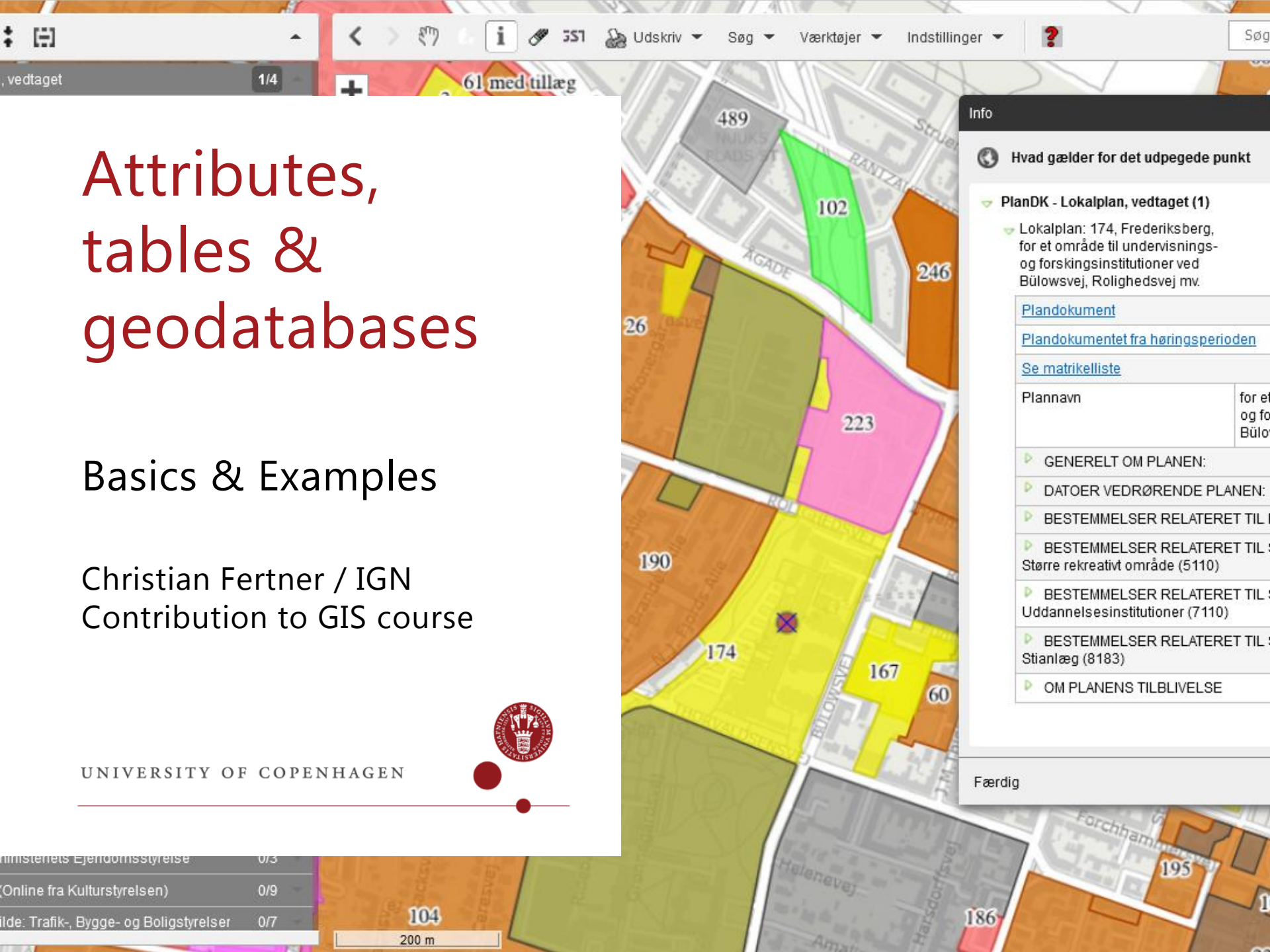


Klassificering af erhvervsrammerne i 9 typer

https://storymaps.arcgis.com/stories/ecfeecd4d5174b45a8116f3bb3a1bd5a

Tipps

- Save data locally (on your network drive) when manipulating probably clip it (but not too narrow)
- Open Attribute table with [Ctrl + t]
- Select several rows with [Shift] or [Ctrl]
- Use different selection methods
- You can open ”dbf”-files (from shapefiles) directly in Excel – but manipulation might result in errors
- Joins: Data type format – is it the same? E.g. municipal kode for Frederisberg ”0147” ”147” both as text and number…
- Once you have joined: Changes in the original table will not be updated in the joined table



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