UNIVERSITY OF TWENTE.

MODERN WEB CARTOGRAPHY AT ITC-UNIVERSITY OF TWENTE

(ENSCHEDE, THE NETHERLANDS)

Gateway to international knowledge exchange focusing on capacity building and institutional development

ITC FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

FACULTY ITC
UNIVERSITY OF TWENTE

In 2010 ITC became a faculty of the University of Twente (UT)

- Distinctive character and mission is preserved
- More firmly embedded in Dutch academic education system
- It will lead to innovative research and education in different areas

ITC

UNIVERSITY OF TWENTE.

UNIVERSITY OF TWENTE

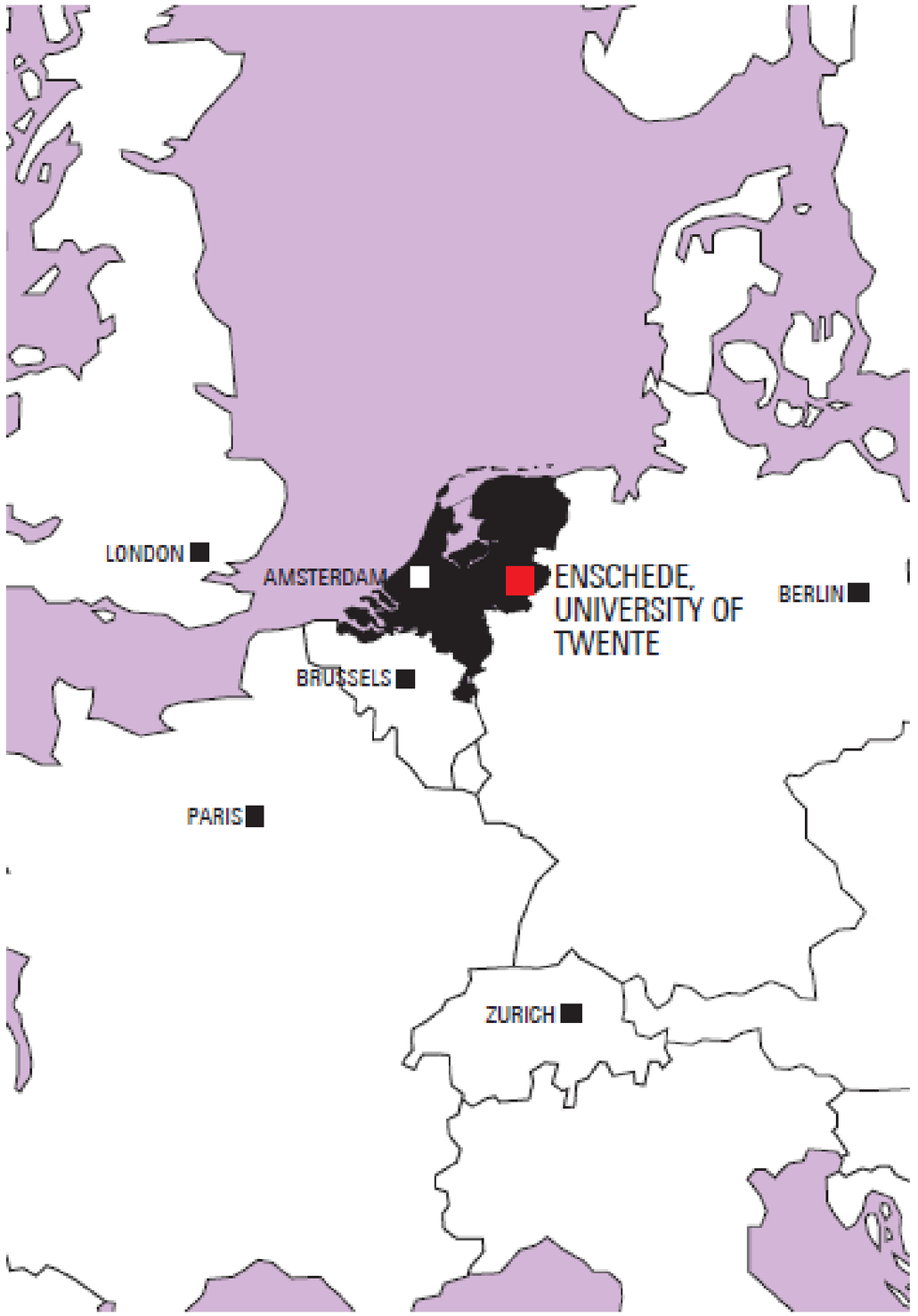
- An entrepreneurial campus university established in 1961
- More than 10,000 students
- 3,300 staff members

ITC UNIVERSITY OF TWENTE.

LOCATION
THE NETHERLANDS

Enschede

- A distinctive modern and lively university town
- At the Eastern border of the Netherlands
- Surrounded by remarkable spots of natural beauty and tranquility



ITC UNIVERSITY OF TWENTE.

FACULTY OF
GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

ITC

UNIVERSITY OF TWENTE.

ITC ESTABLISHED IN 1950

BY MINISTER WILLEM SCHERMERHORN

1950

International **T**raining **C**entre for Aerial Survey, ITC

1968

International Institute for Aerial Survey and Earth Sciences, ITC

1985

International Institute for Aerospace Survey and Earth Sciences, ITC

2002

International Institute for Geo-Information Science and Earth Observation, ITC

2010

Faculty of Geo-Information Science and Earth Observation, ITC
University of Twente

ITC

UNIVERSITY OF TWENTE.

WHAT'S ITC ALL ABOUT?

GEO-INFORMATION MANAGEMENT, WORLDWIDE AND INNOVATIVE

- One of the world's foremost education and research establishments in geo-information science and earth observation
- A wide range of disciplines and activities in this field
- Contribute to capacity building in developing countries and emerging economies
- Solving real world problems
- Multicultural environment with staff and students from over 175 countries

KEY FIGURES 2013

- 939 newly registered students
- 348 degrees/diplomas/certificates awarded
- 161 registrants for the graduate programme (31 December)
- 44 external projects
- More than 20,000 alumni from 175 countries

SIX SCIENTIFIC DEPARTMENTS

OPERATING AS CENTRES OF EXCELLENCE

- Covering the different fields of disciplinary interest that encompass ITC's core mission:
  - Earth Observation Science
  - Earth Systems Analysis
  - Geo-information Processing
  - Natural Resources
  - Urban and Regional Planning and Geo-information Management
  - Water Resources

GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

Combination of tools and methods for the

- collection
- storage and
- processing

of geo-spatial data and for the dissemination and use of these data and of services based on these data

- Focus on tools and methods and on application of these in:
  - food security
  - water management
  - urban planning
  - land administration
  - disaster management
  - strengthening civil society
  - earth sciences
  - environmental management and biodiversity

ITC'S CORE ACTIVITIES

- Education
- Research
- Capacity development

UNIVERSITY OF TWENTE.

EDUCATION
A MULTICULTURAL ENVIRONMENT

Photo: Gerard Kuster

Photo: Gerard Kuster

TARGET GROUP

- Young and mid-career professionals and scientists
- From developing and emerging countries
- Increasingly professionals from industrialized countries

Photo: Gerard Kuster

COURSES

IN THE DEGREE AND DIPLOMA PROGRAMMES

Geo-information science and earth observation for

- Applied Earth Sciences
- Geoinformatics
- Land Administration
- Natural Resources Management
- Urban Planning and Management
- Water Resources and Environmental Management

- Environmental Modelling and Management
- Geographical Information Management and Applications

Education and Culture DG
ERASMUS MUNDUS

GIMA
Geographical Information Management and Applications

ITC
UNIVERSITY OF TWENTE.

RESEARCH

SPACE FOR GLOBAL DEVELOPMENT

CAPACITY DEVELOPMENT

IN THE FRAMEWORK OF INTERNATIONAL DEVELOPMENT COOPERATION

ITC UNIVERSITY OF TWENTE.

PROJECT SERVICES

TAILORED TO THE NEEDS OF OUR CLIENTS

- Institutional development
- Advisory services
- Contract training
- Contract research and development

EDUCATION PARTNERSHIPS

An interactive Carto Dashboard for Distributed Statistical Data in an SDI

- what is it?
- where did it come from?
- how does it work?
- how does it ACTUALLY work?

An interactive Carto Dashboard for Distributed Statistical Data in an SDI

?

An interactive Carto Dashboard for Distributed Statistical Data in an SDI

a system that can consume a combination of statistical data from the SDI, and cartographically integrate them, so that visual comparison of data from different providers or different data from a single provider is optimized.

The Carto Dashboard can be considered as a "smart data viewer"

A new role
for the cartographer

providing
(cartographic knowledge for)
tools that implement cartographic intent:

"code that thinks like a cartographer"

Cartography from Code...?

or

"how I learned to stop worrying and love coding in cartography"

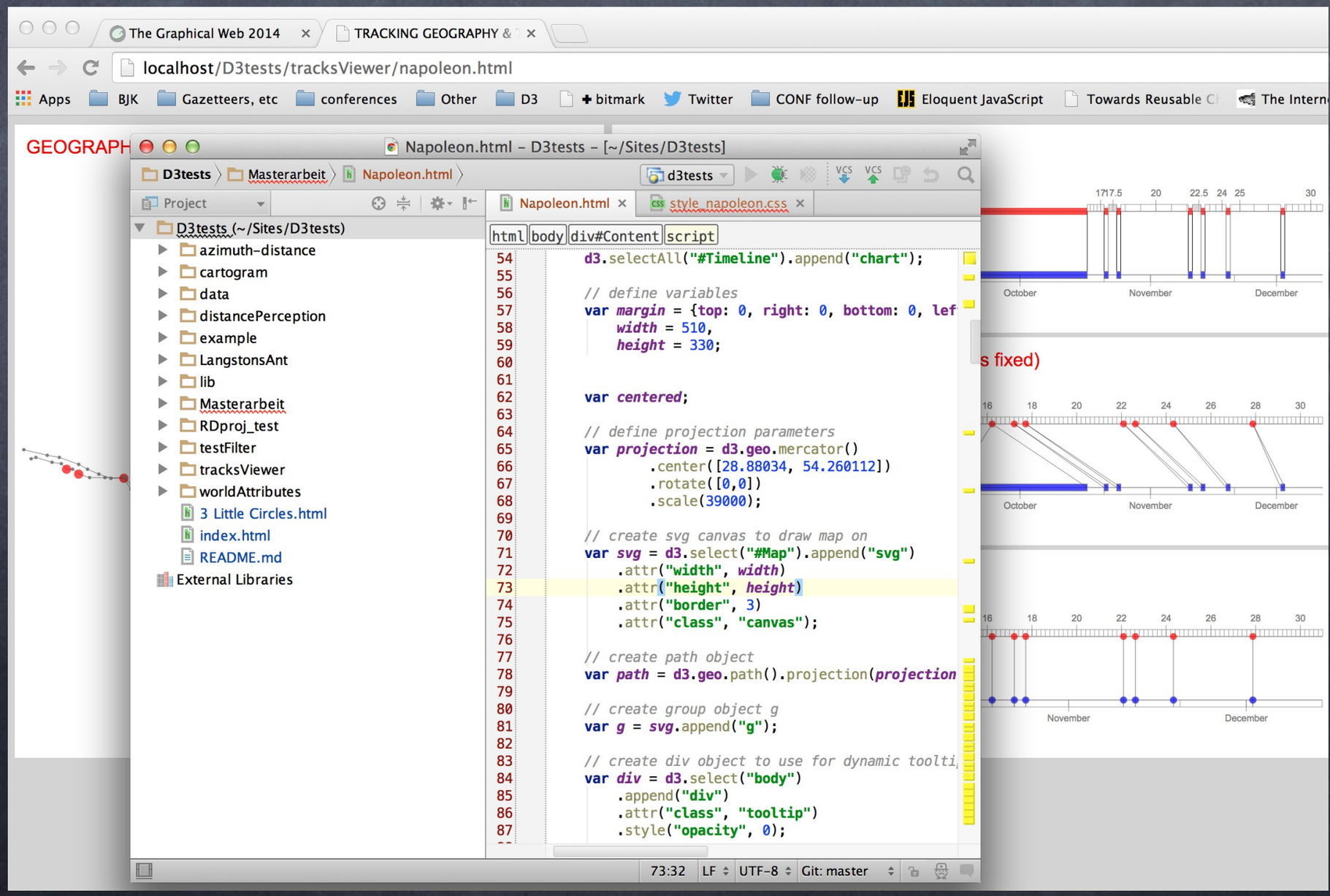
Barend Köbben
ITC – Universiteit Twente
b.j.kobben@utwente.nl – @barendkobben

A change in my world

My tools once were these:

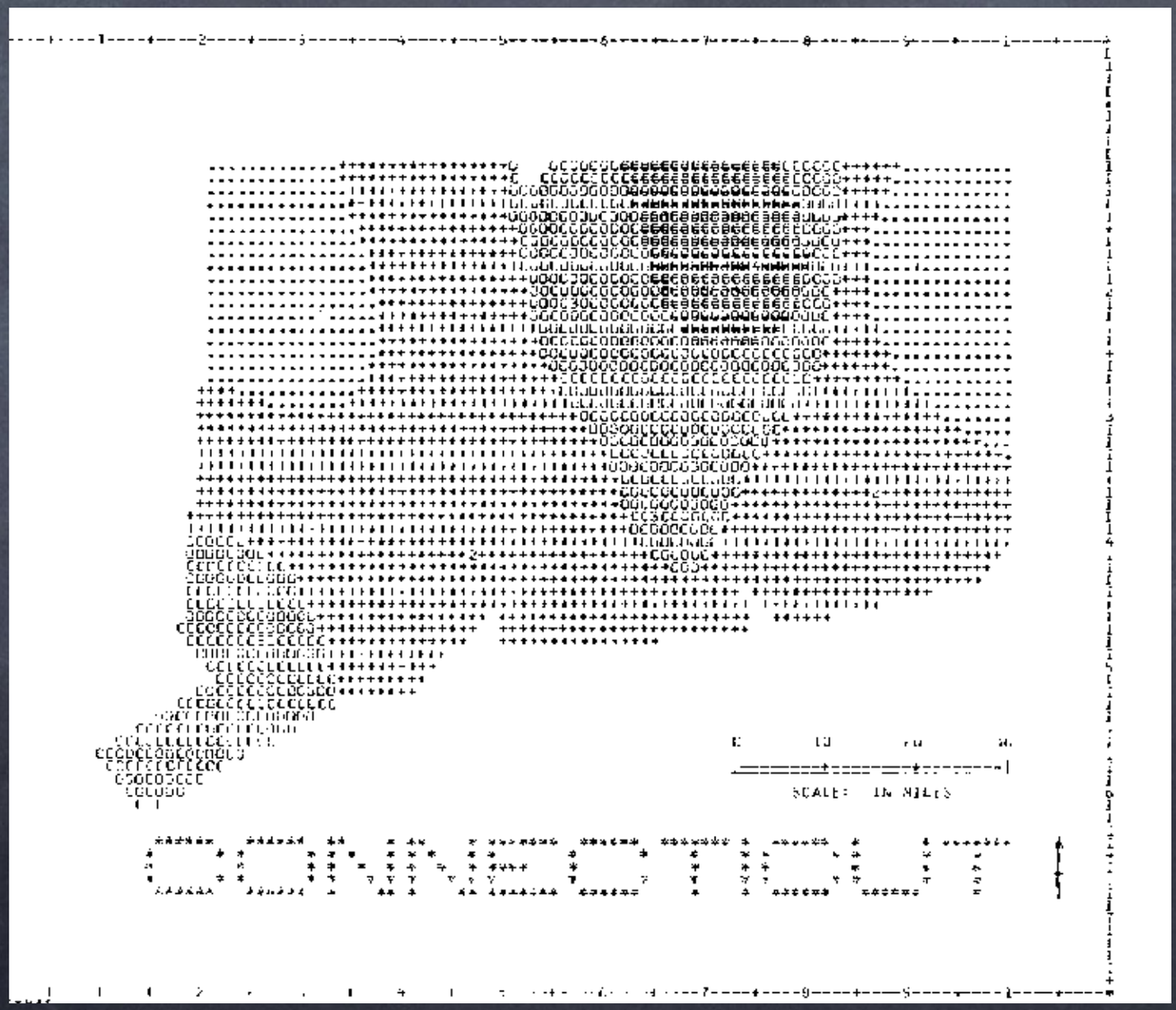
A change in my world

...but now look like this:



A change in my world

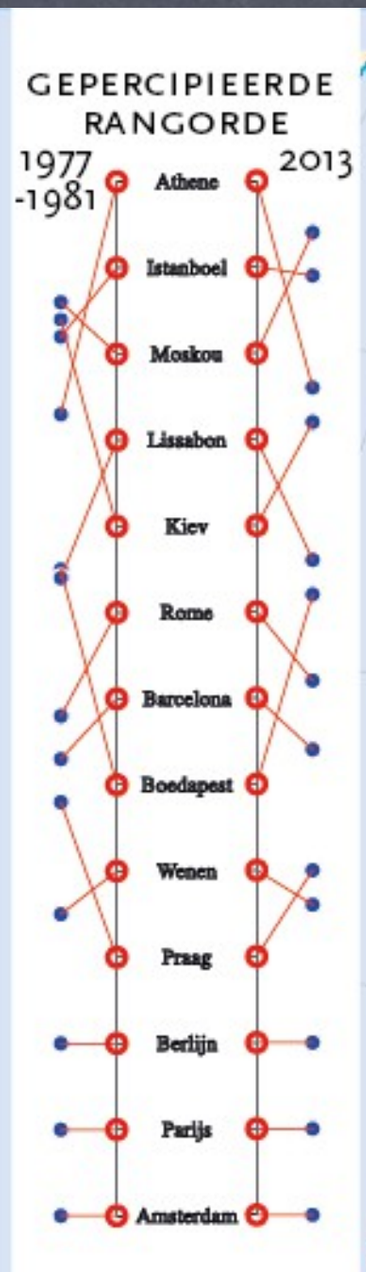
Computers gave me this at first:



SYMAP line printer output (1965, by Howard Fisher)

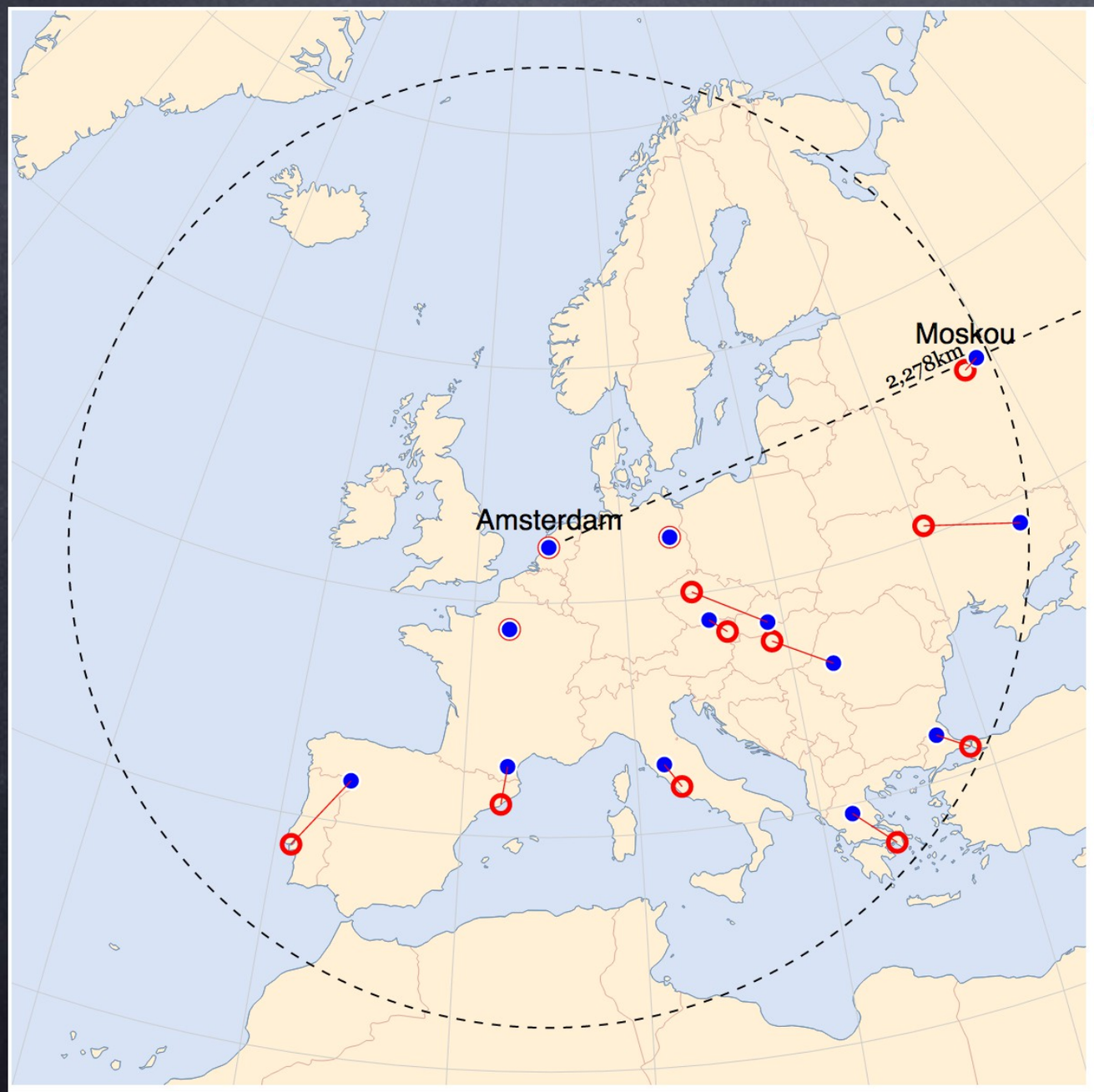
A change in my world

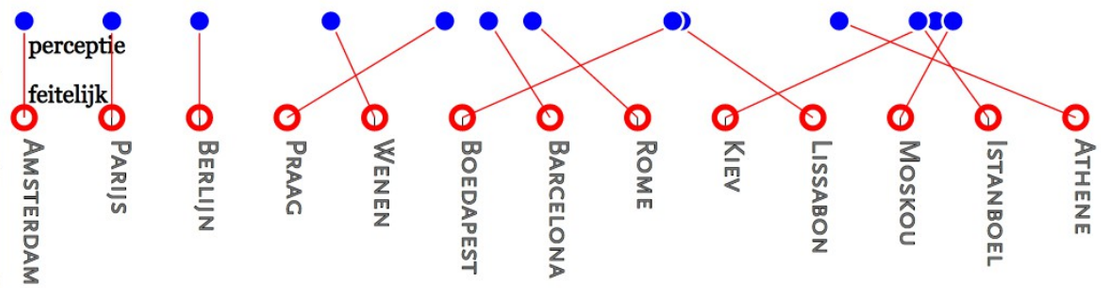
...but have been improving since:



A change in my world

...and now allow me to do really nice interactivity:





FACTUAL | PERCEPTION 1977–1981 | PERCEPTION 2013

Perceived distances 1977-1981 and 2013

Students situate Eastern-European cities too far and Southern-European to close.

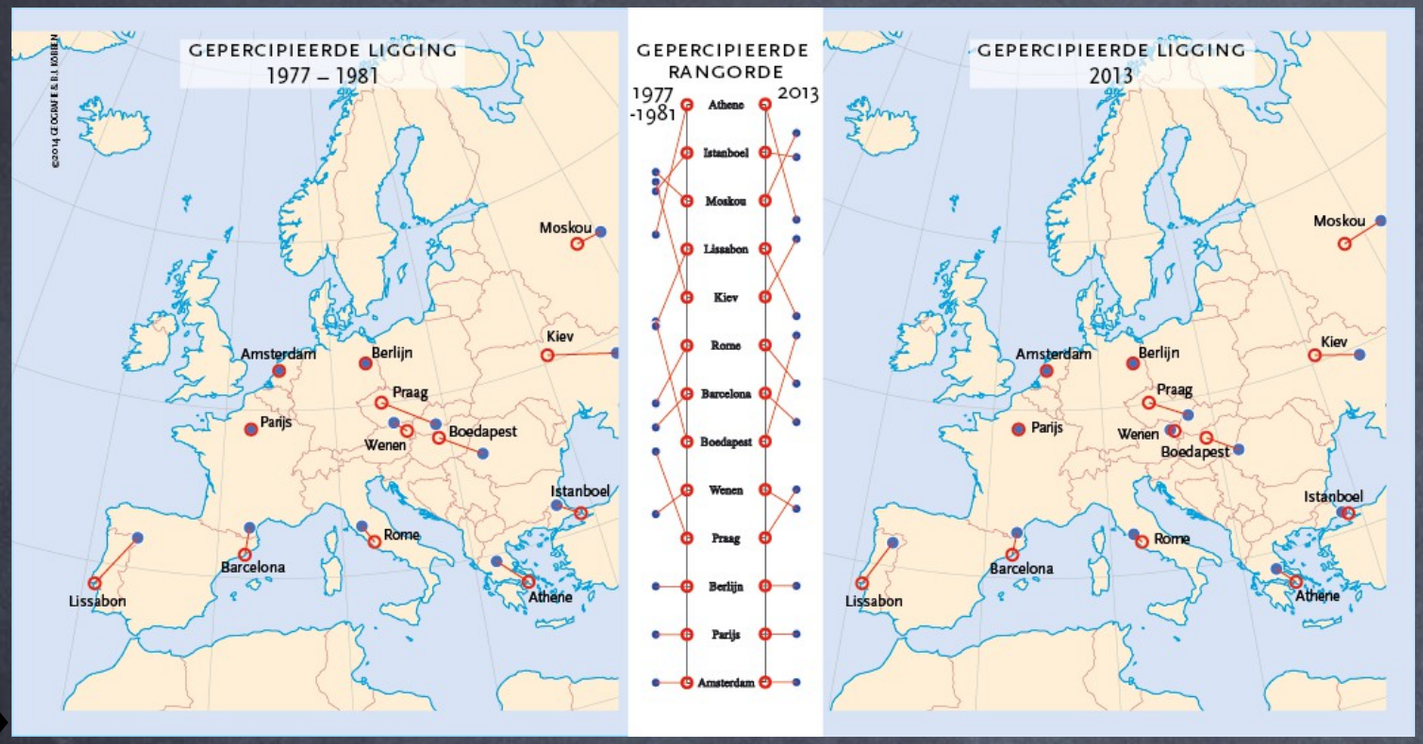
Click the buttons to see the differences between factual locations (and order) and how they were perceived by Geography students...

Works in modern browsers supporting HTML5 (not IExplorer 8 and lower)
[map made for paper: Oost-Europa bijft ver weg, de Pater et al, Geografie, 2014-03, pp.12-15]

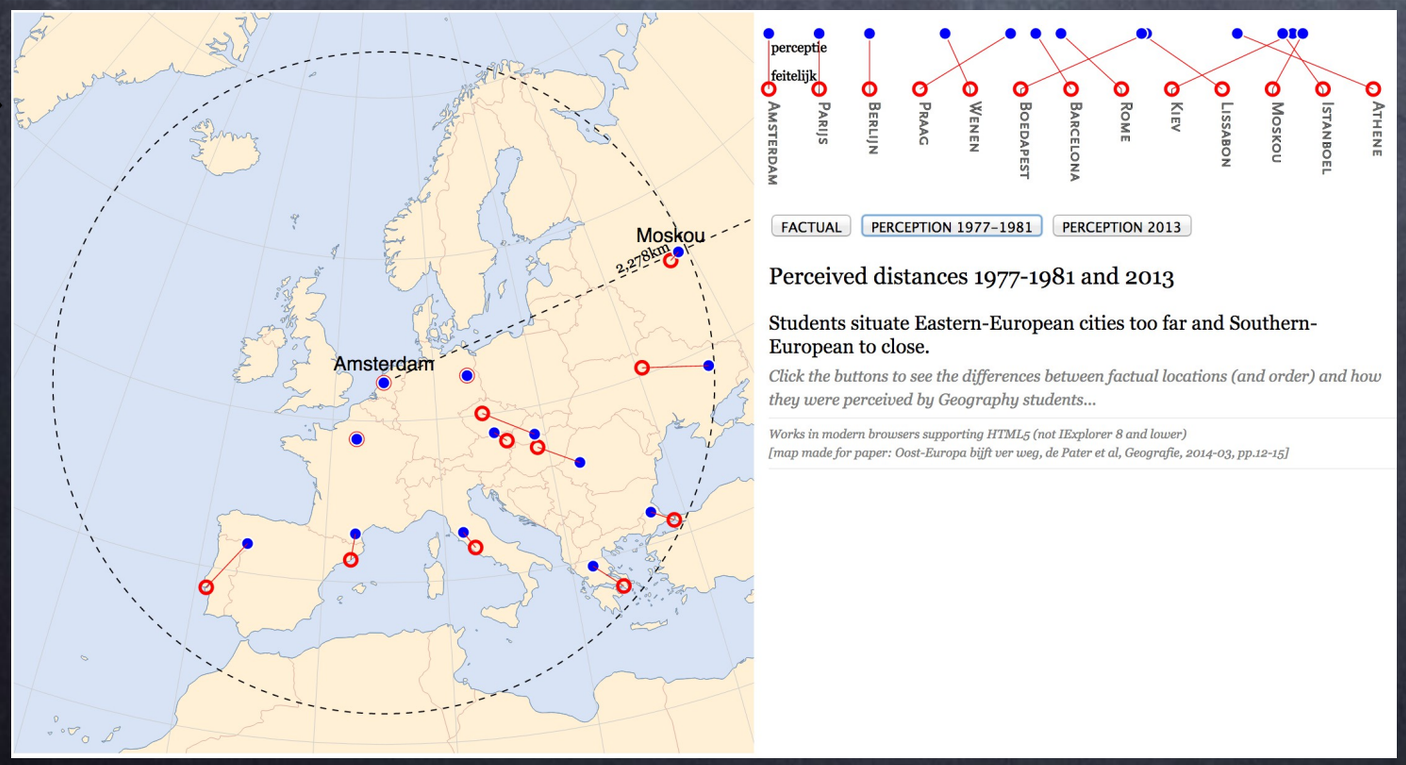
http://kartoweb.itc.nl/kobben/D3tests/distancePerception/index_en.html

A change in my world

Both were constructed using software



this one was digitally drawn



this one was coded (programmed)

A new role for the cartographer

providing

tools that implement cartographic intent

A new role
for the cartographer

providing
(cartographic knowledge for)
tools that implement cartographic intent

The new role of the cartographer

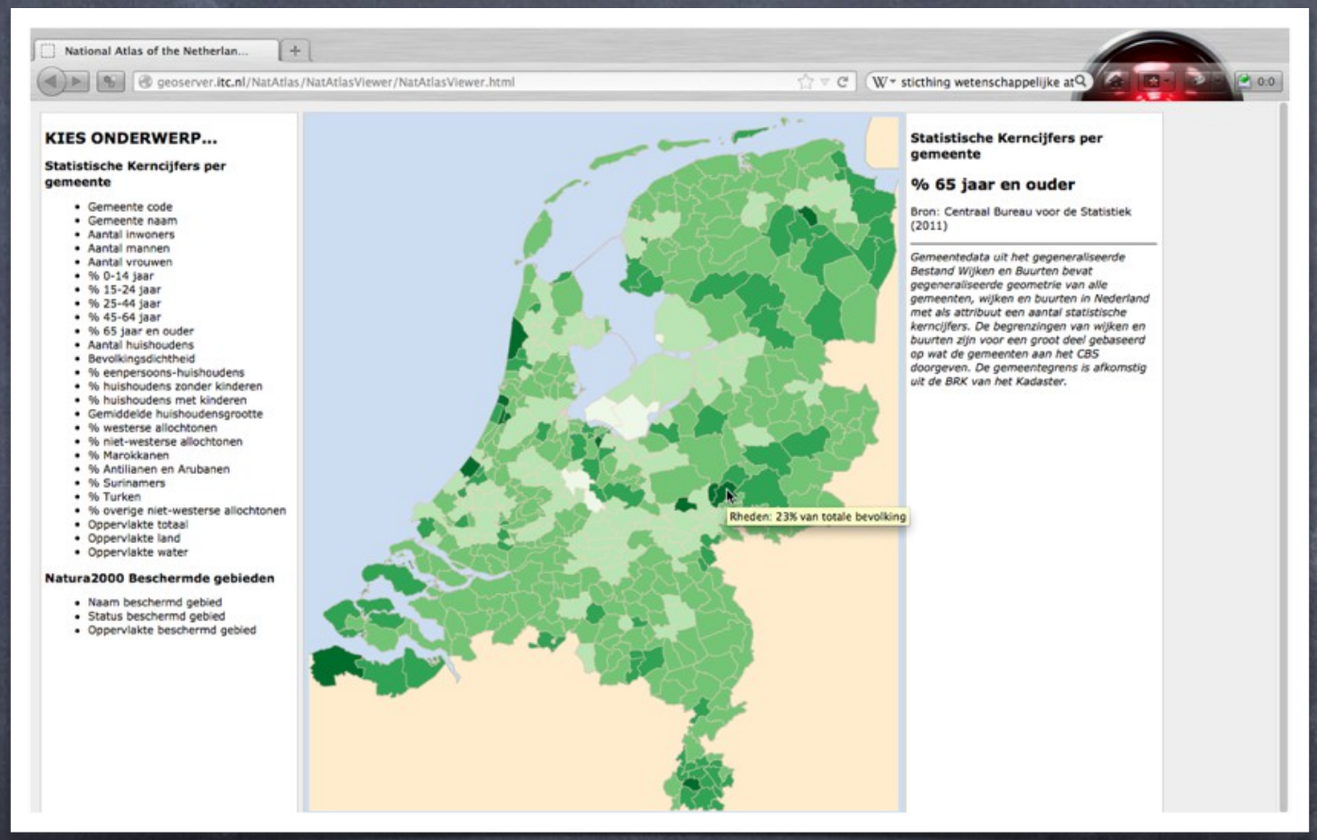
providing
(cartographic knowledge for)
tools that implement cartographic intent:

"code that thinks like an atlas"

Statistics Dashboard

Building further on the
NATIONAL ATLAS IN SDI
prototype

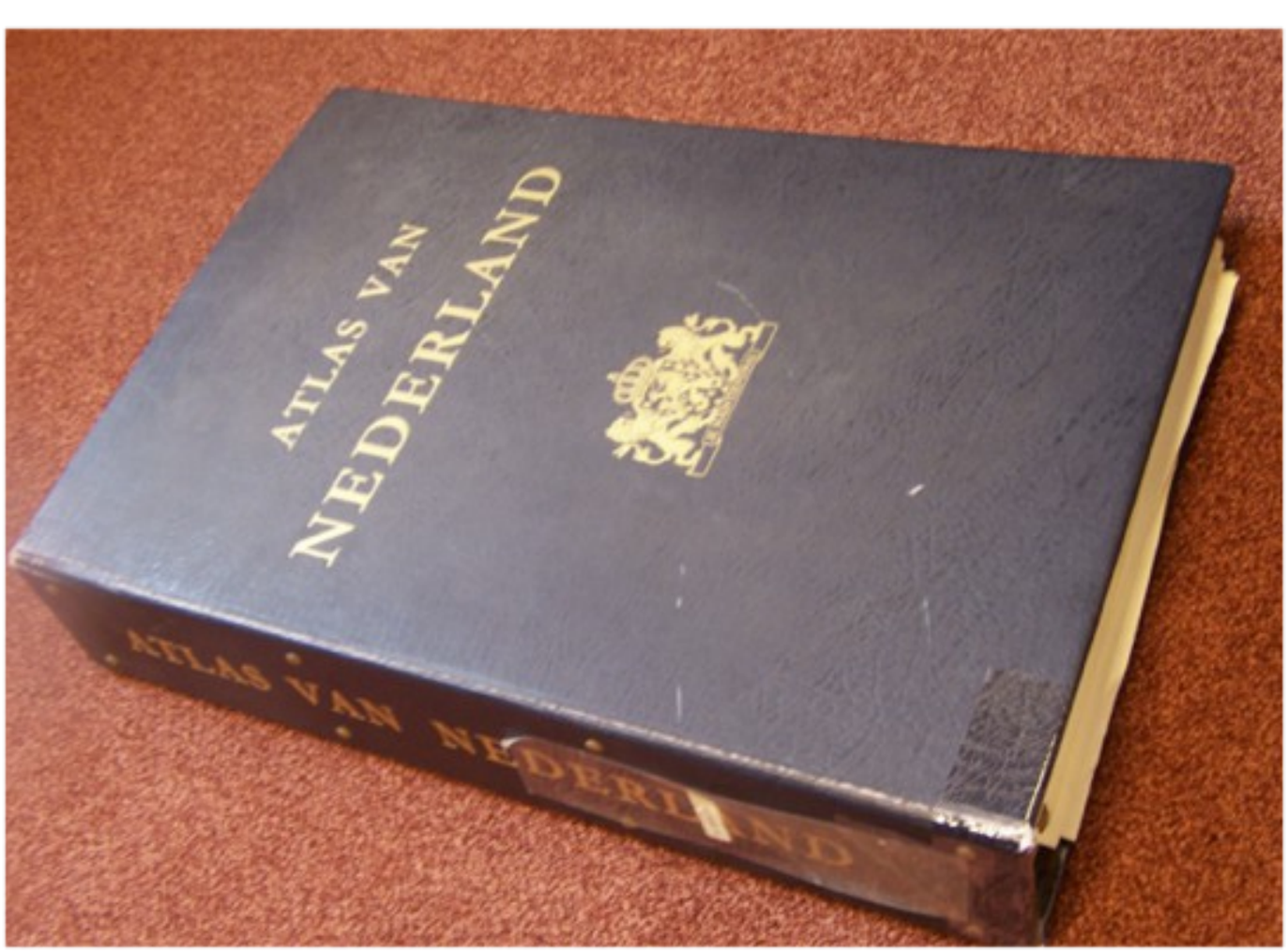
The Dutch National Atlas within SDI



details in Dresden paper:
Cartographic Journal, 50 : 3, pp. 225—231

Brief history of the Dutch National Atlas

Brief history of the Dutch National Atlas



1st edition (1963–1978)

Brief history of the Dutch National Atlas

2nd edition (1989–1995)

Brief history of the Dutch National Atlas

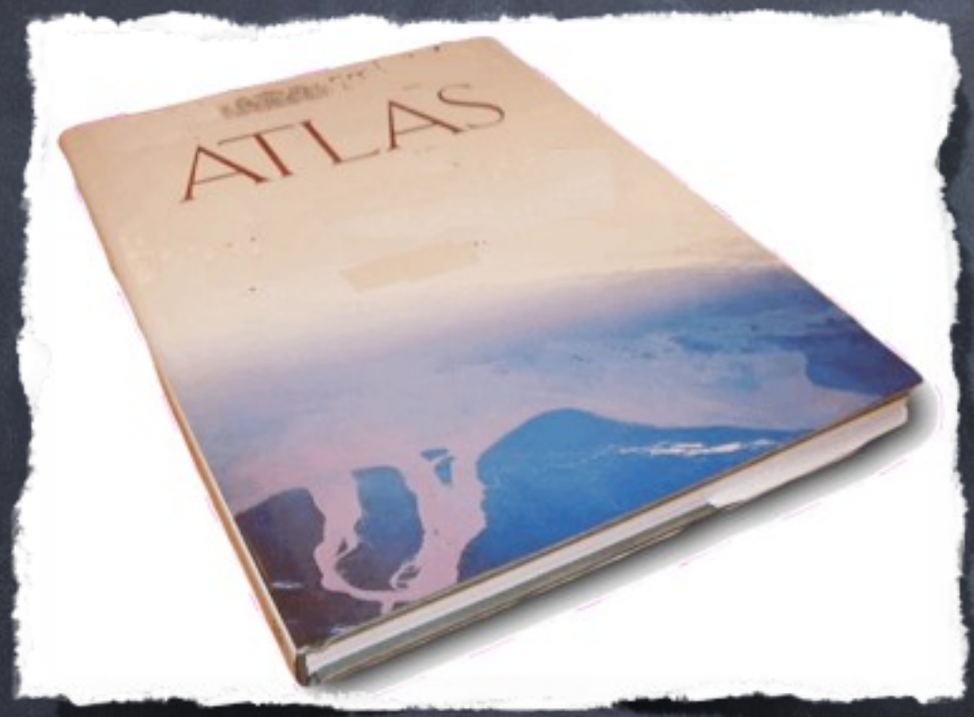
after 1998 government involvement and funding ended

=> limited and fragmented academic projects to keep atlas alive

2000:
digital facsimile of 2nd edition

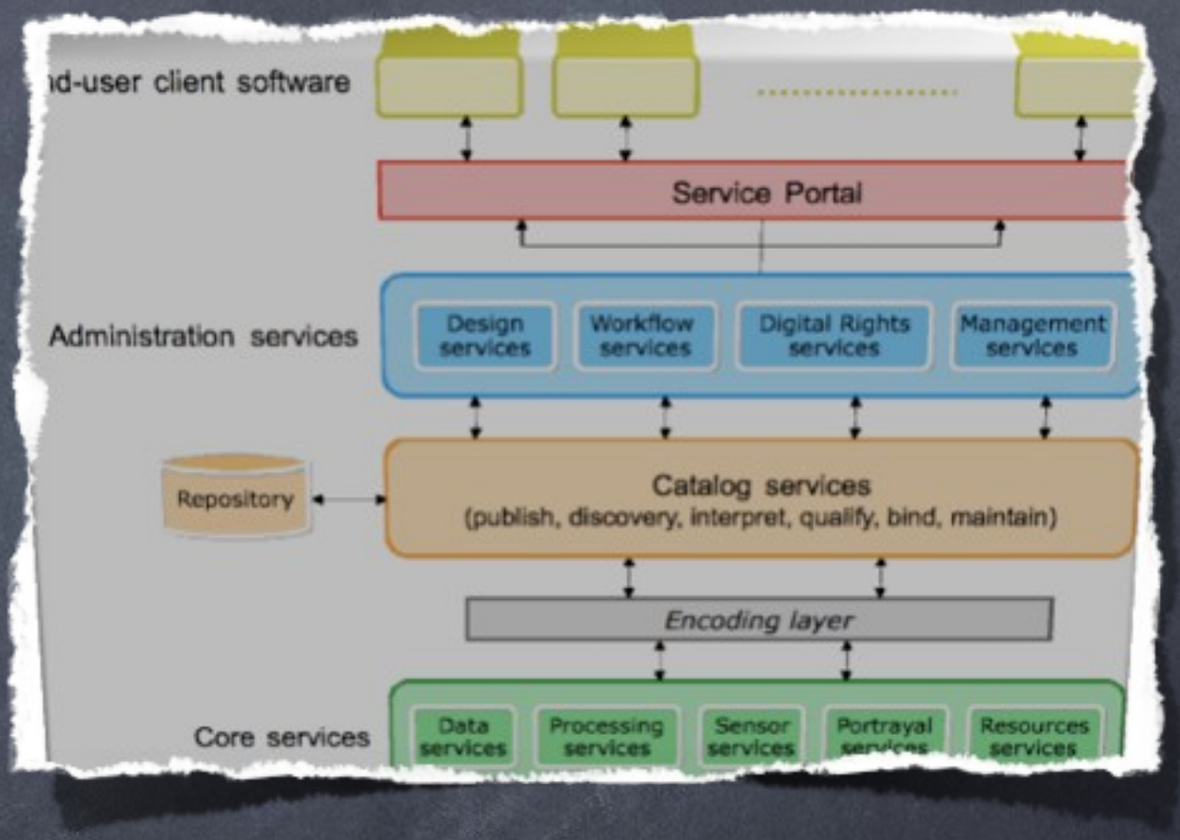
Atlas as part of a Spatial Data Infrastructure

Atlas as part of a Spatial Data Infrastructure



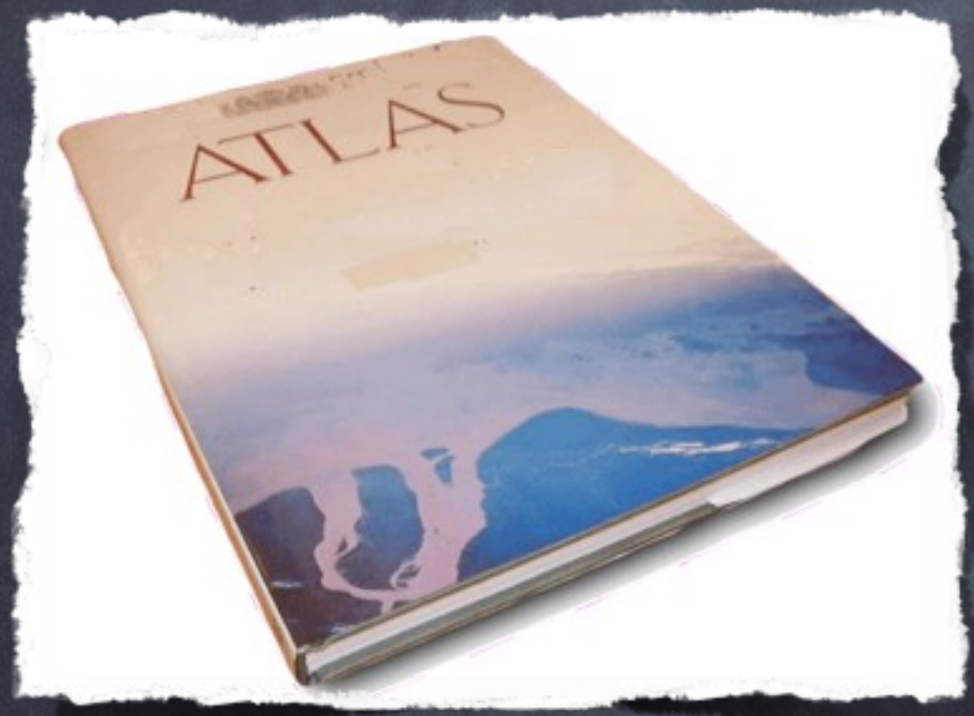
presents a synthesis
optimised for visualisation

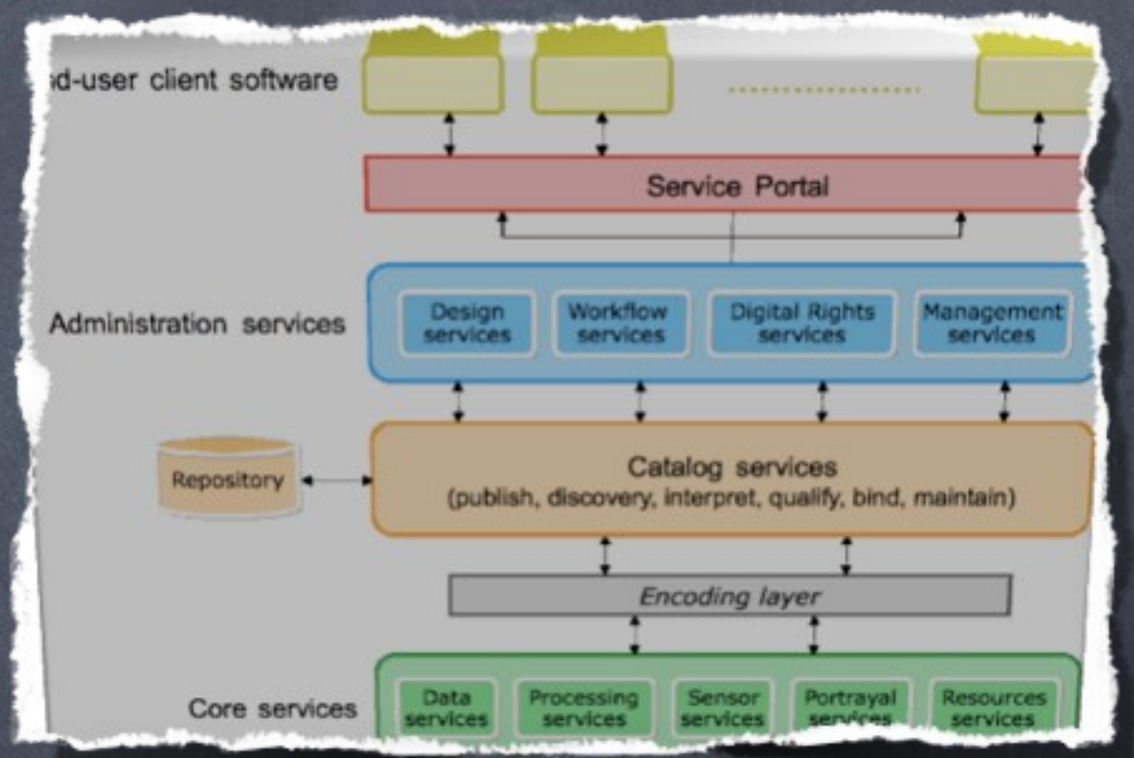
Atlas as part of a Spatial Data Infrastructure



visualisation of separate data, not optimised for combinations (synergy)

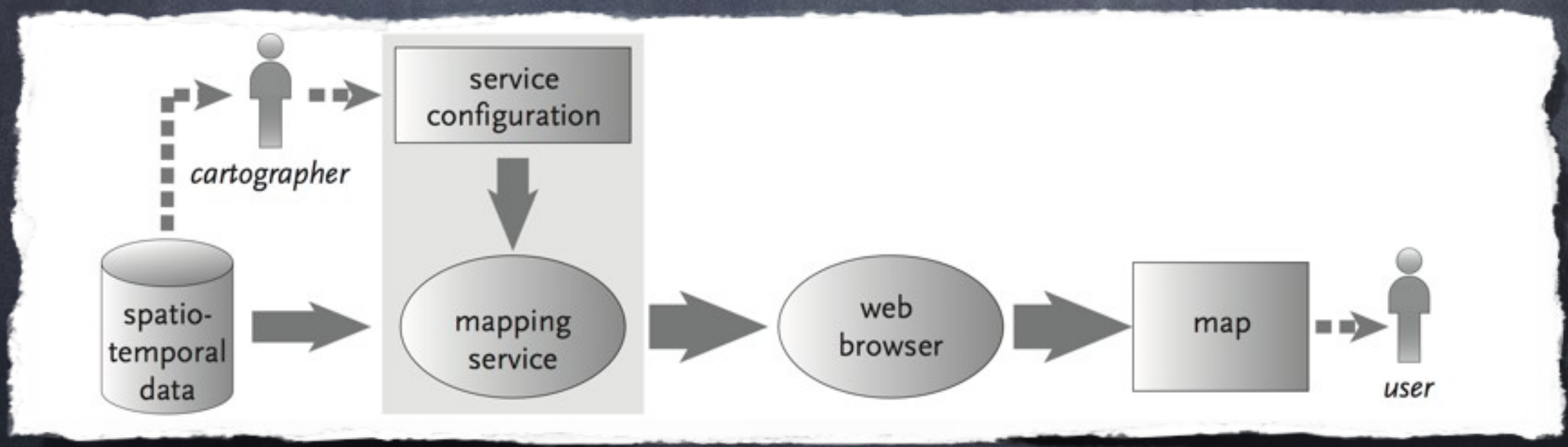
Atlas as part of a Spatial Data Infrastructure



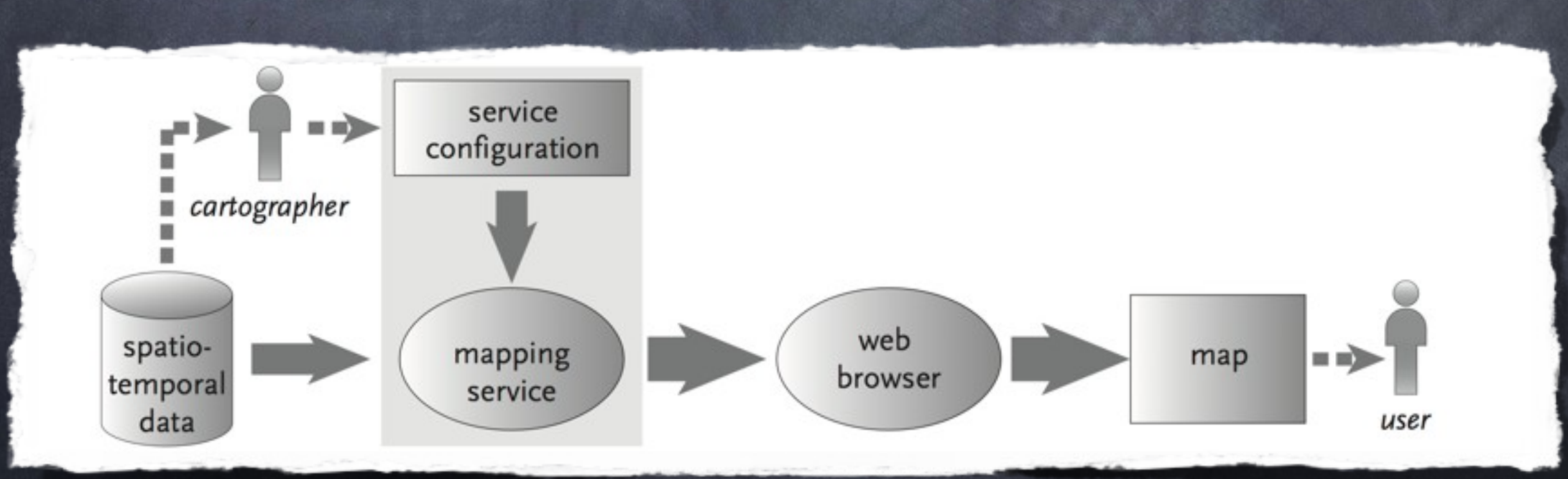


a combination of
two different worlds

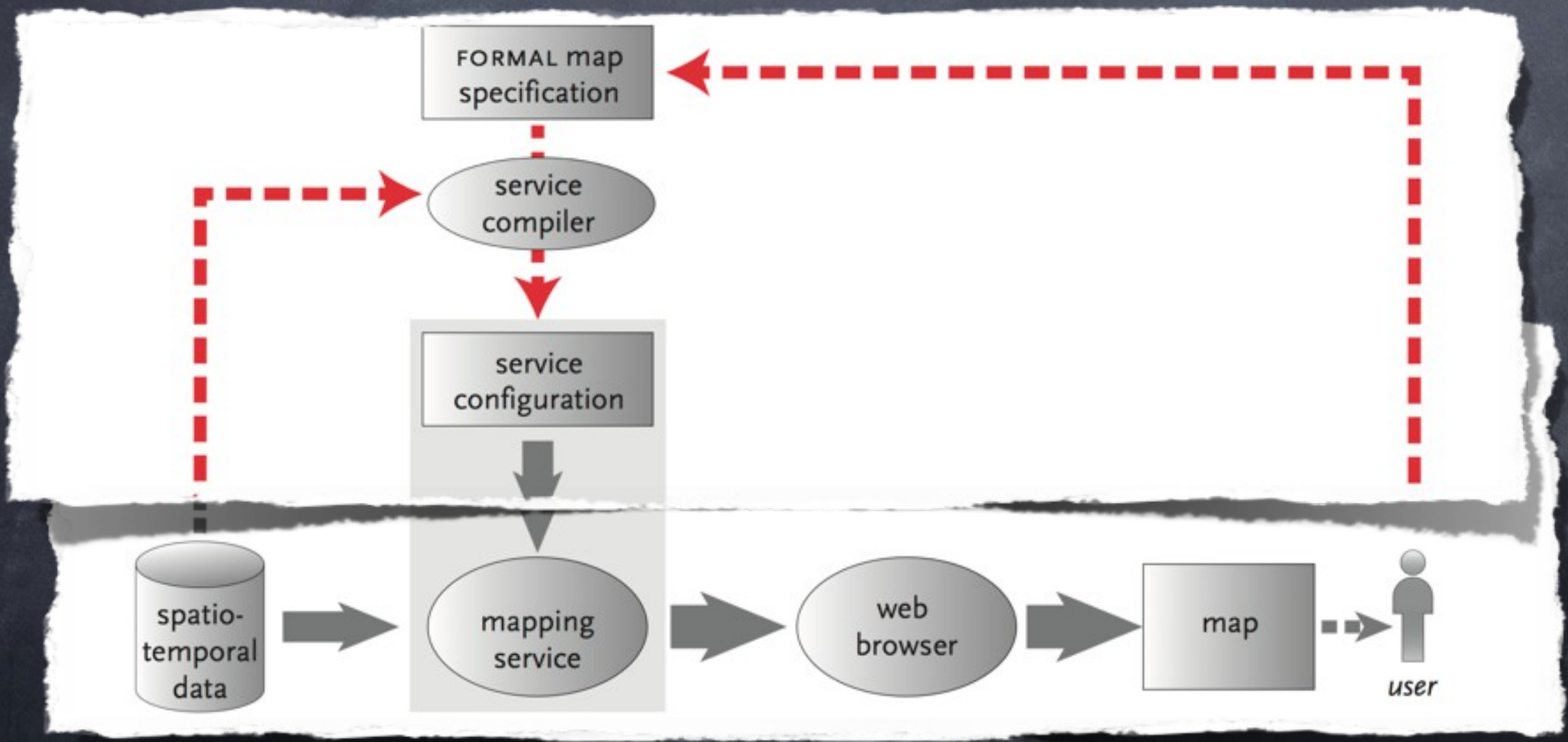
Mapping in a webservices environment



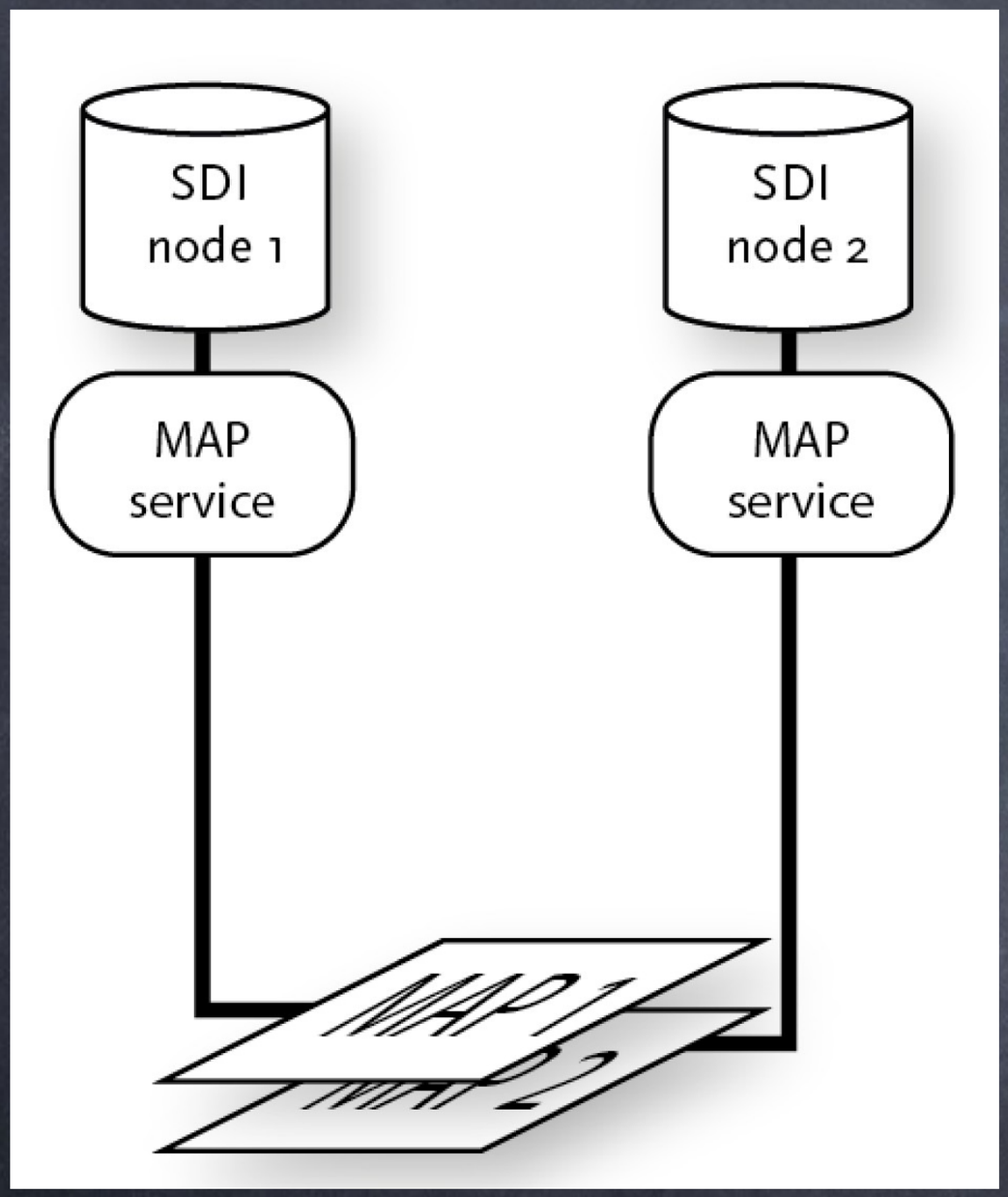
Mapping in a webservices environment as part of



Mapping ~~in~~ a webservices environment as part of

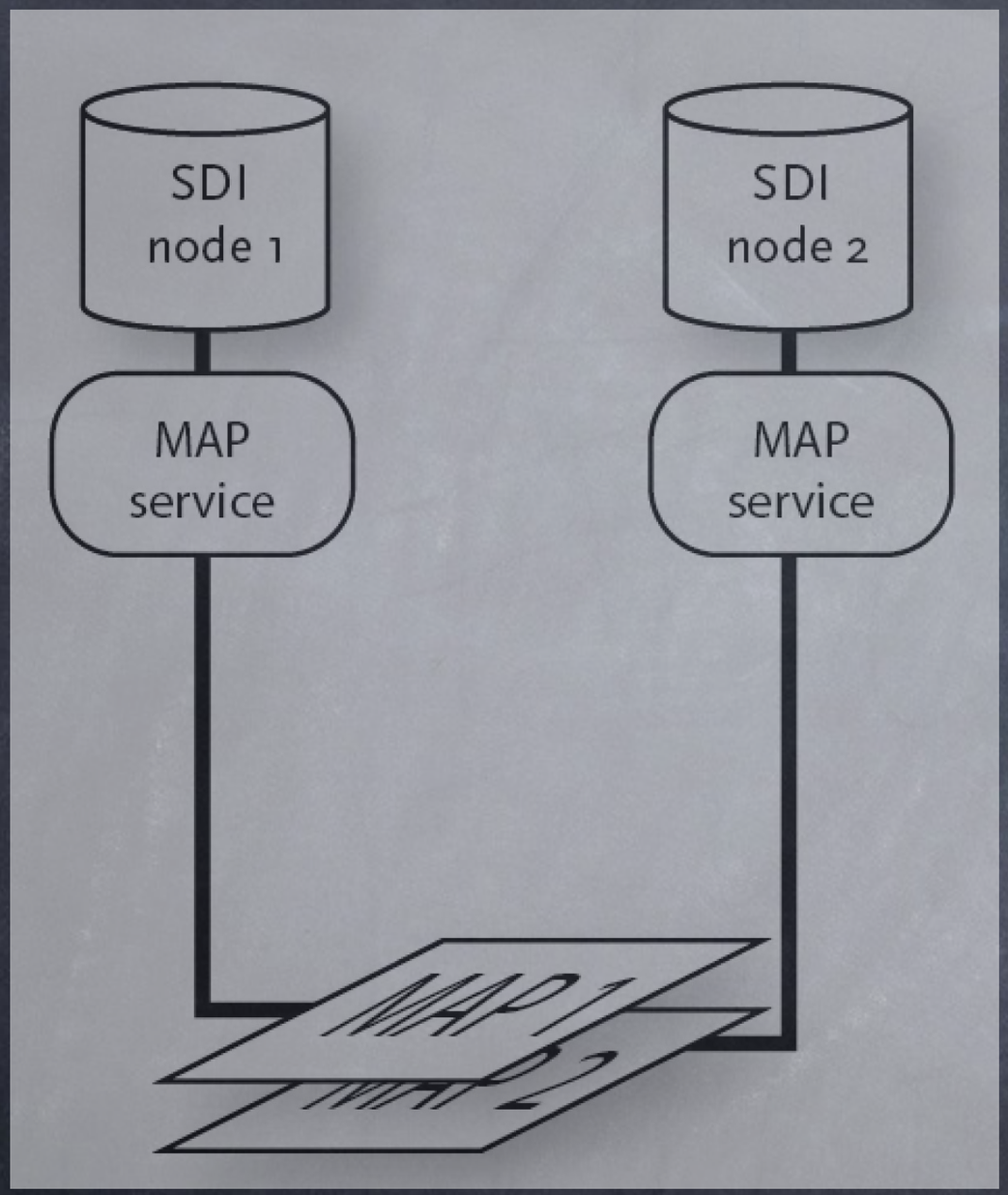


conceptual change needed

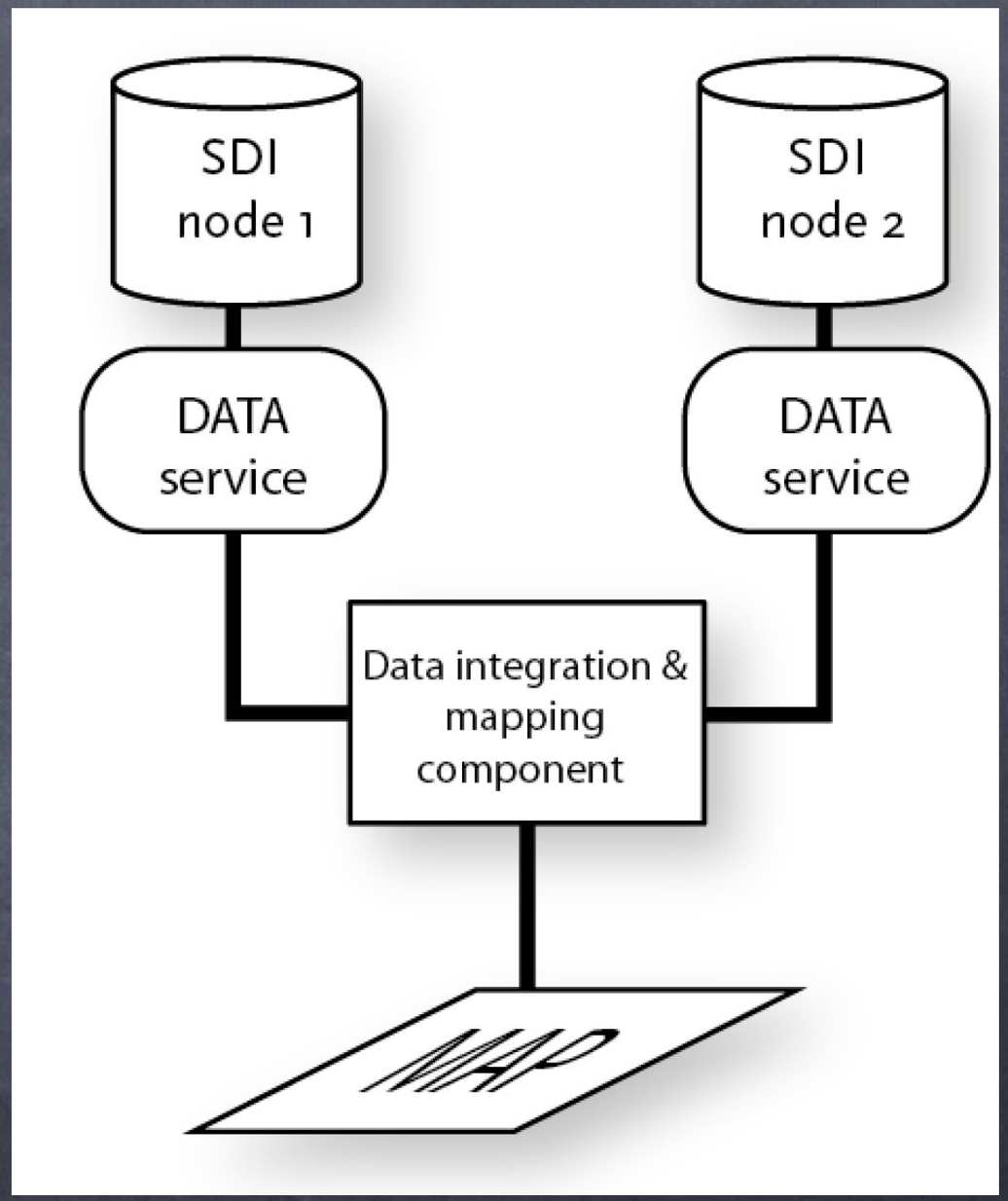


sub-optimal combination
of arbitrary map layers

conceptual change needed



sub-optimal combination of arbitrary map layers



integrated mapping of data layers

Statistics Dashboard

Building further on the Atlas prototype

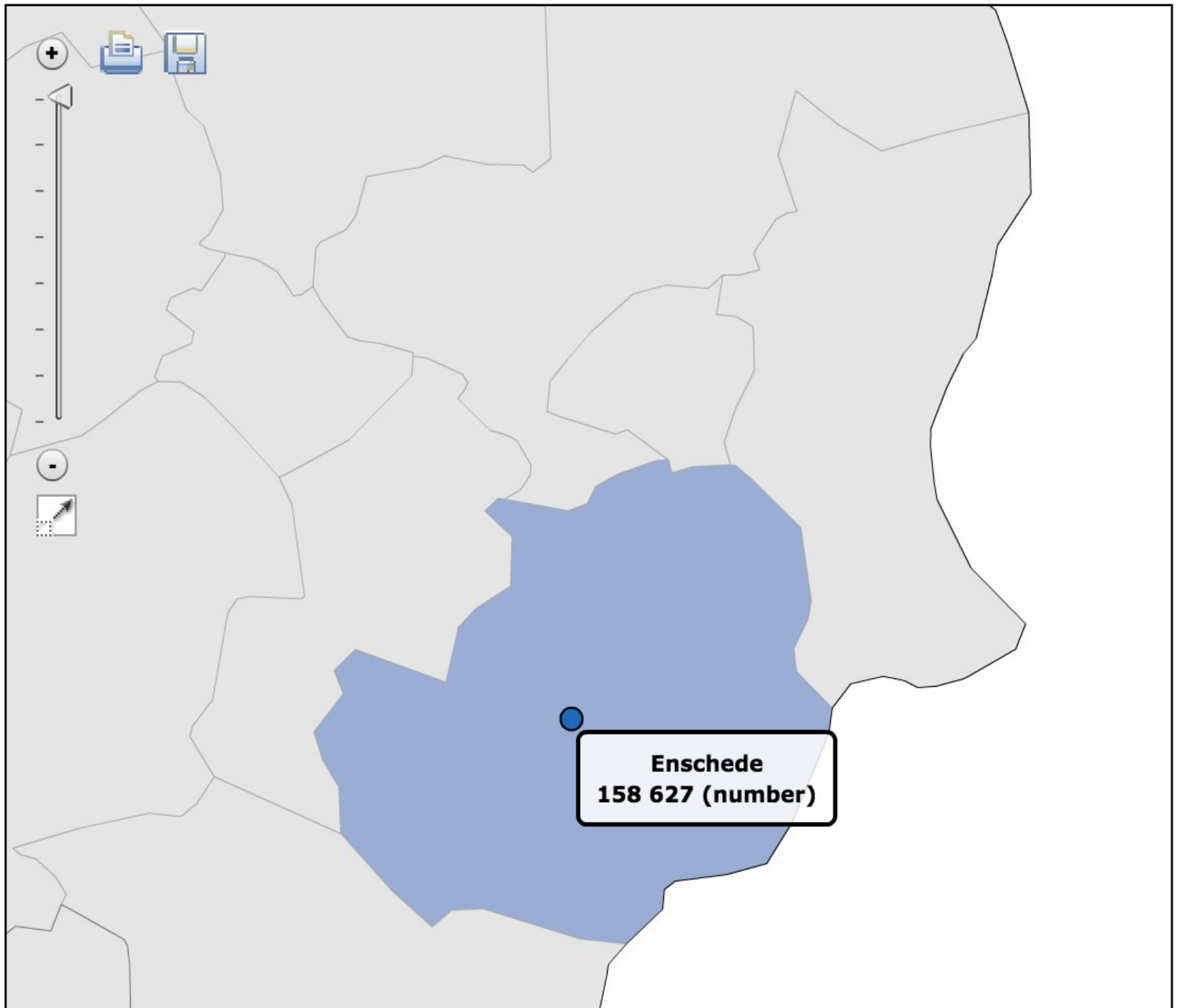
Specifically for Statistical Data
From Statistics Netherlands (CBS)
- Open Data, API using ODATA standard -
To be combined with other SDI data

Statistics Netherlands

StatLine | Search term | theme | map

Population dynamics; birth, death and migration per region

June 16 2014 | more info



Minimap +

Options +

Key (number) −

158 627
0

Selection −

Subjects

Population on 1 January

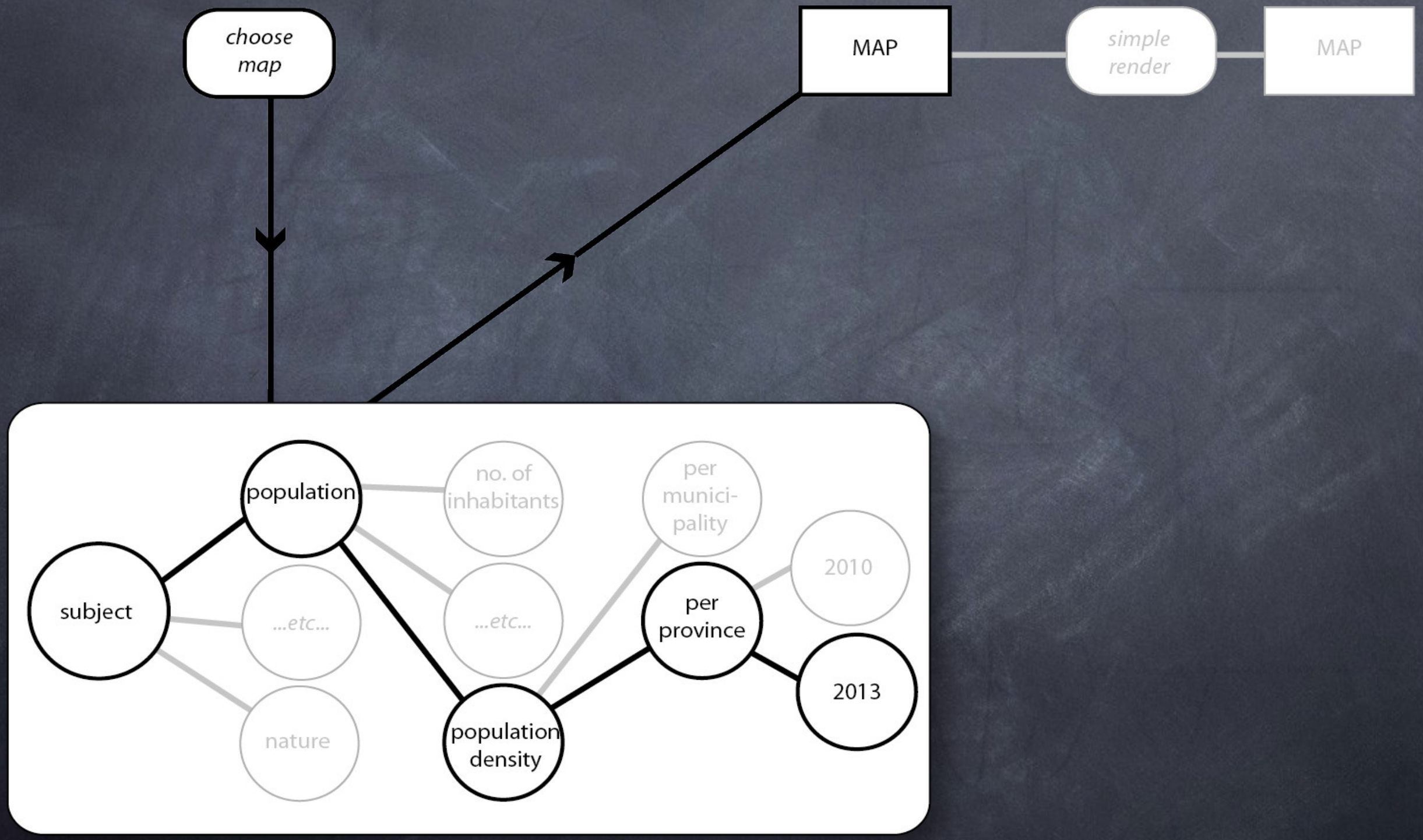
Sex

Males and females

Periods

2013

Statistics Dashboard UI setup



DEMO TIME!

Statistics Dashboard

Building further on the Atlas prototype

Specifically for Statistical Data

Concentrating on ***comparison tools:***

in theme: same place and time, different variables
in time: same variable, different times
in space: same variable, different places/aggregation

Statistics Dashboard

comparison tools

in theme: same place and time, different variables

CHOOSE MAP...

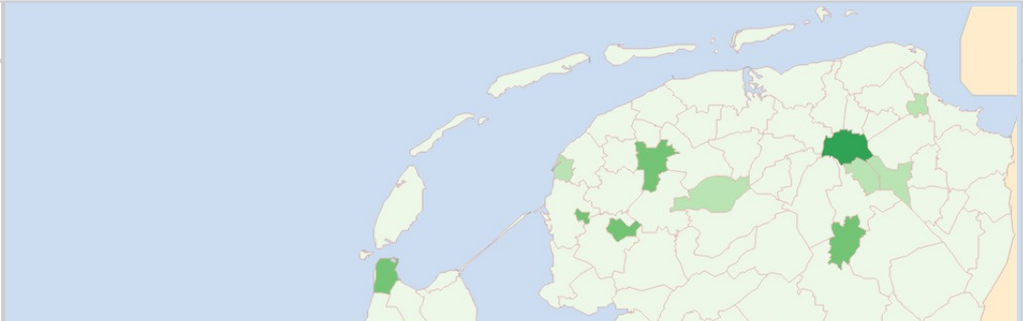
Population

Population Density

per municipality (2011)

inhabitants per km2:
- 0 – 400
- 400 – 800
- 800 – 1600
- 1600 – 3200
- 3200 – 6400

Geodata: Kadaster
Attribute data: Statistics Netherlands



COMPARE WITH...

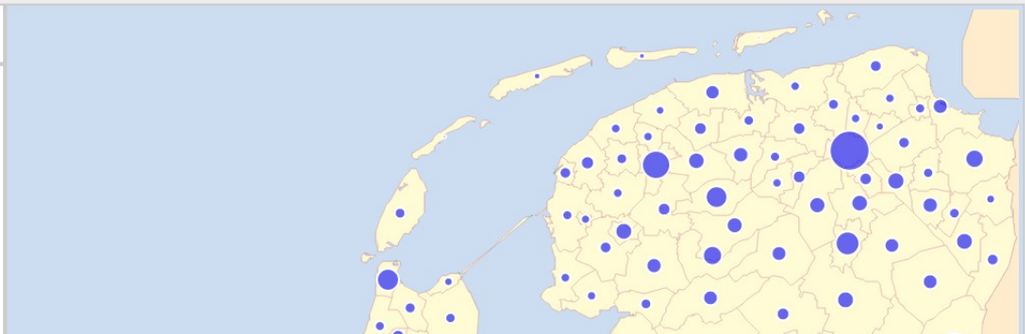
Population

Number of inhabitants

per municipality (2011)

inhabitants:
- 0
- 255818
- 511637
- 767455

Geodata: Kadaster
Attribute data: Statistics Netherlands



X-Position: Opacity: Swipe: Background: Show

Statistics Dashboard

comparison tools

in time: same variable, different times

CHOOSE MAP...

Population

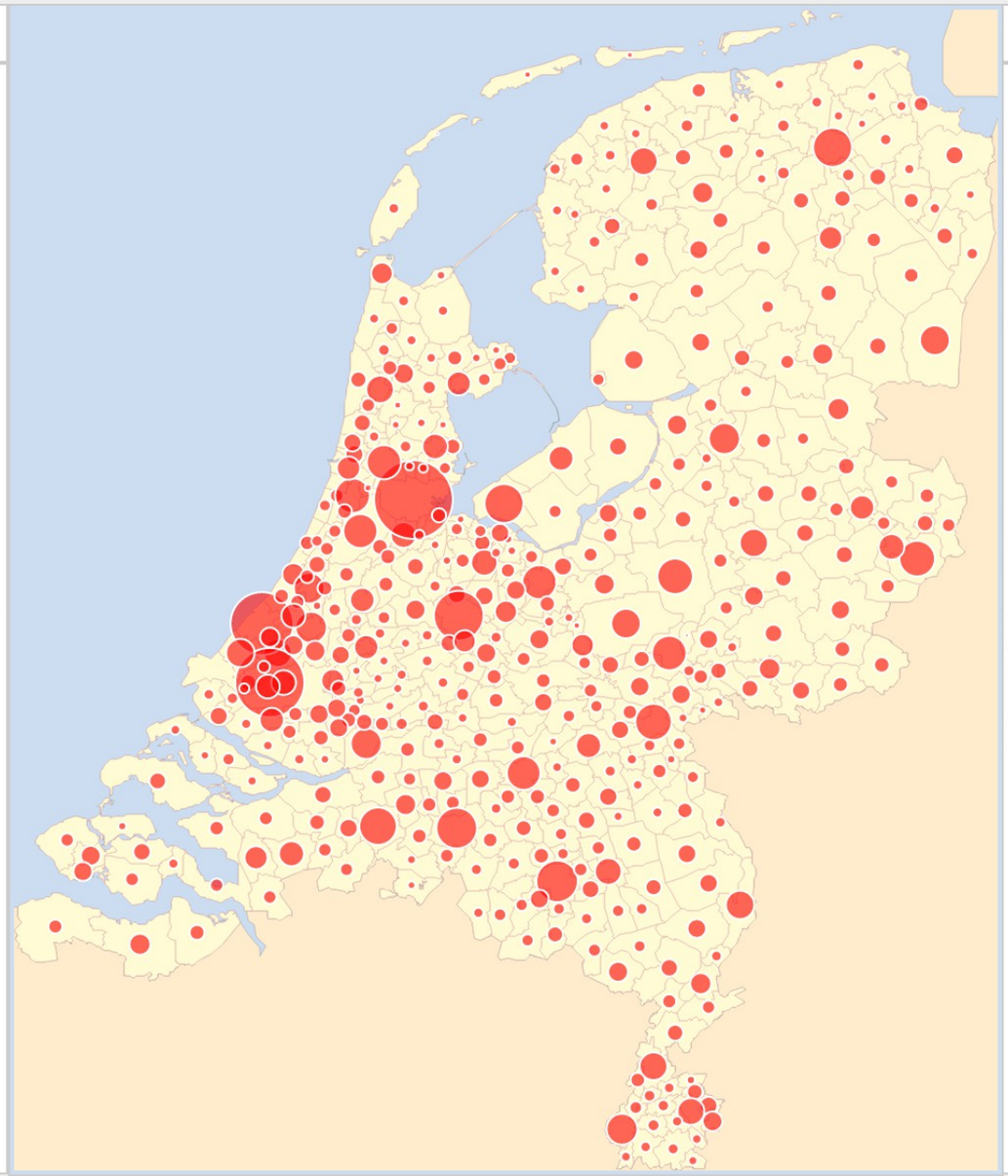
Number of inhabitants

per municipality (2011)

inhabitants:

0
255818
511637
767455

Geodata: Kadaster
Attribute data: Statistics Netherlands



COMPARE WITH...

Population

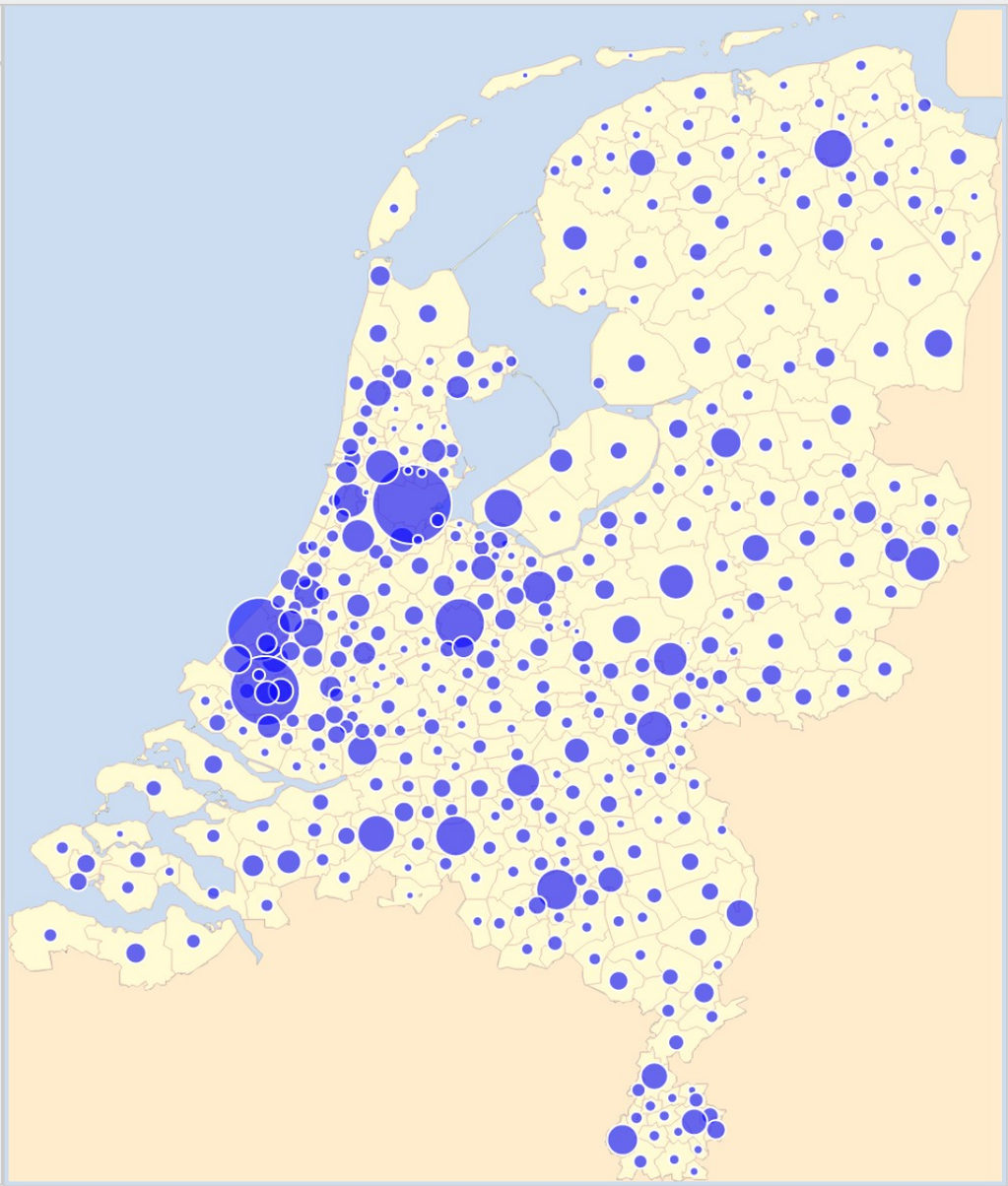
Number of inhabitants

per municipality (2013)

inhabitants:

0
266425
532850
799275

Geodata: Kadaster
Attribute data: Statistics Netherlands



X-Position: Opacity: Swipe: Background: Show

Statistics Dashboard

comparison tools

in space: same variable, different places/aggregation

CHOOSE MAP...

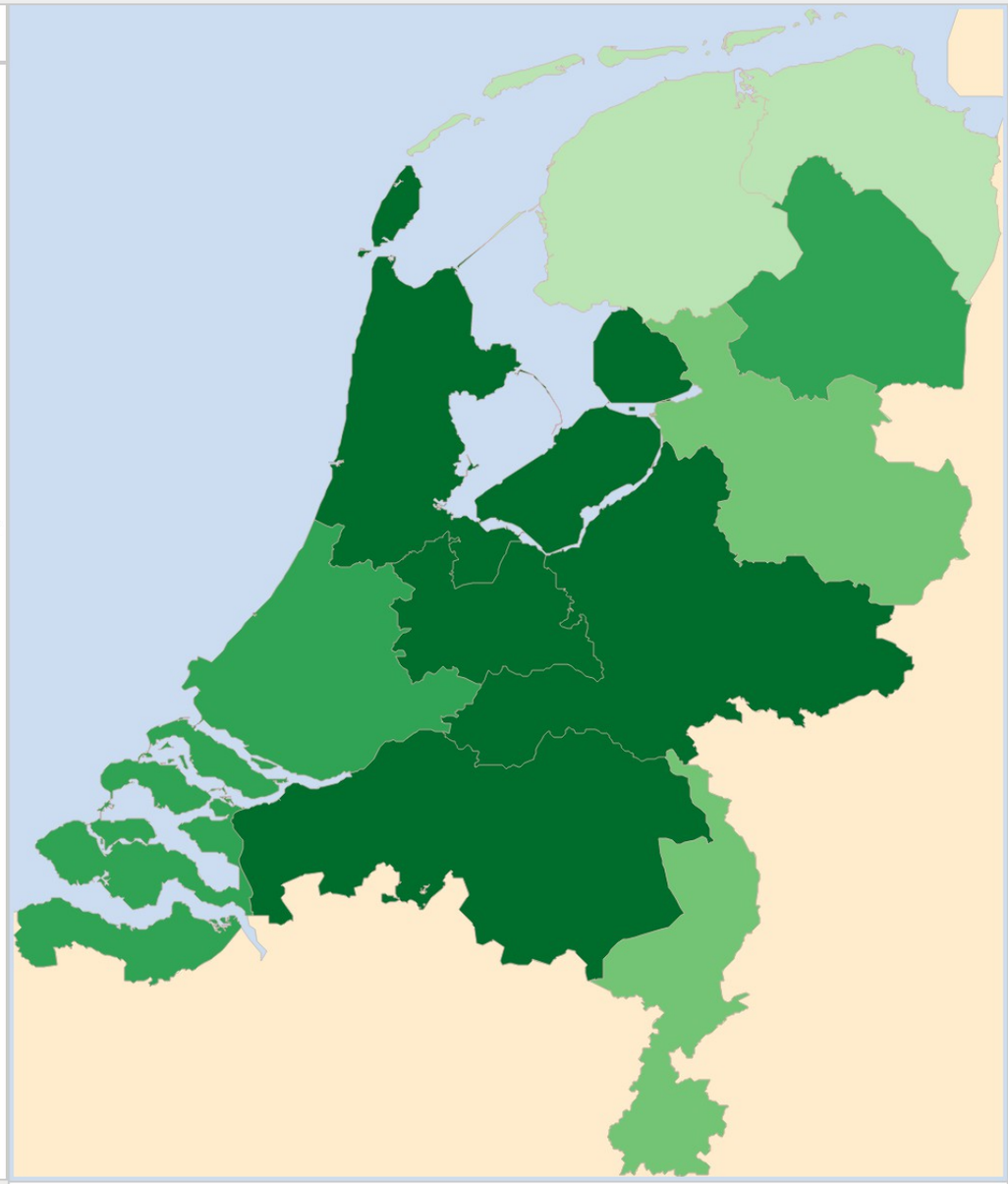
Economy

Average income per inhabitant

per province (2012)

thousand Euro:
- 27.8 – 27.8
- 27.8 – 32.0
- 32.0 – 33.3
- 33.3 – 33.9
- 33.9 – 36.1

Geodata: Kadaster
Attribute data: CBS StatLine
©2011-15: Foundation Scientific Atlas of the Netherlands



COMPARE WITH...

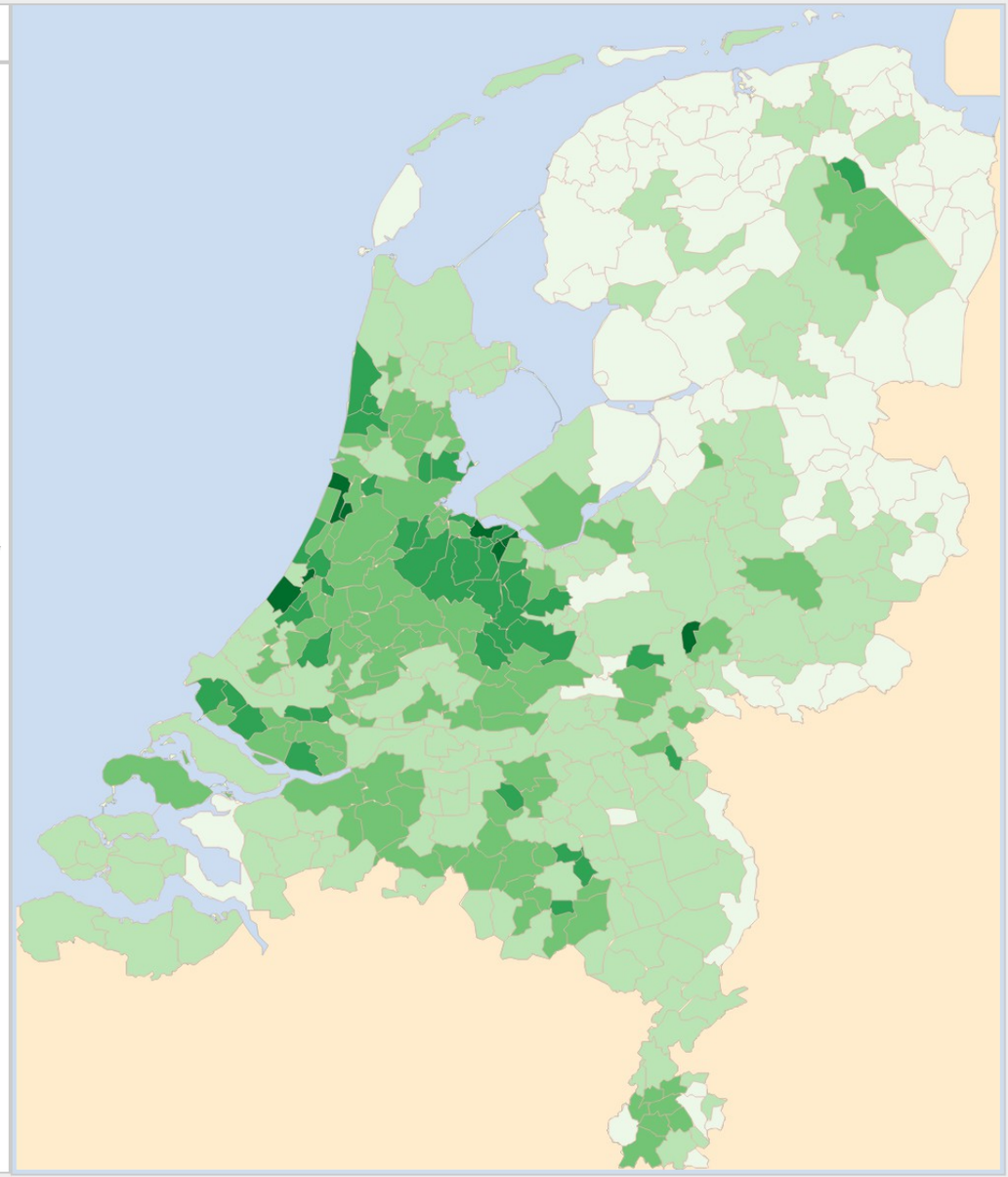
Economy

Average income per inhabitant

per municipality (2013)

thousand Euro:
- 15.6 – 20.6
- 20.6 – 22.7
- 22.7 – 25.3
- 25.3 – 30.3
- 30.3 – 36.1

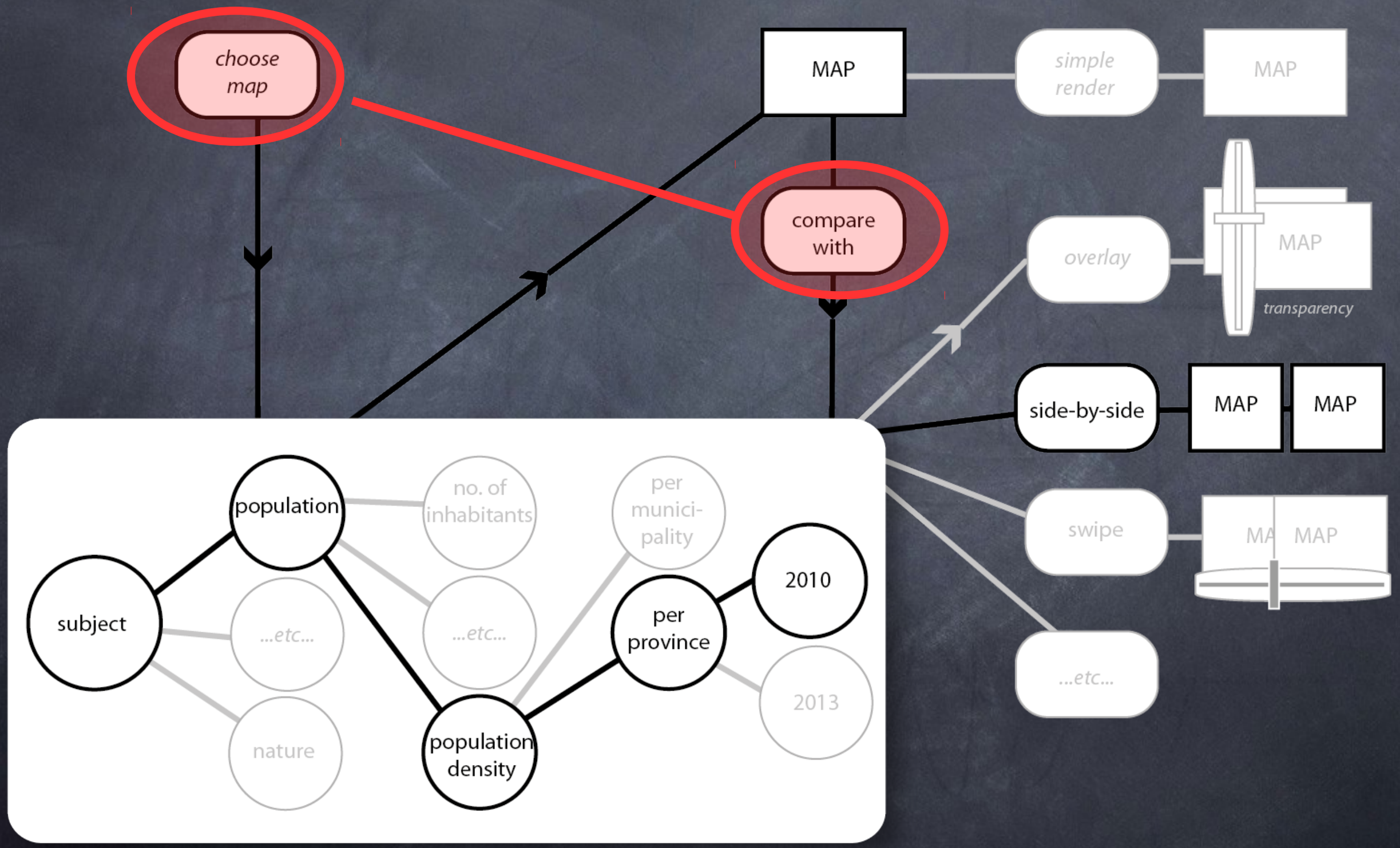
Geodata: Kadaster
Attribute data: CBS StatLine
©2011-15: Foundation Scientific Atlas of the Netherlands



X-Position: Opacity: Swipe: Background:

Show

Statistics Dashboard UI setup



SIDE BY SIDE

CHOOSE MAP...

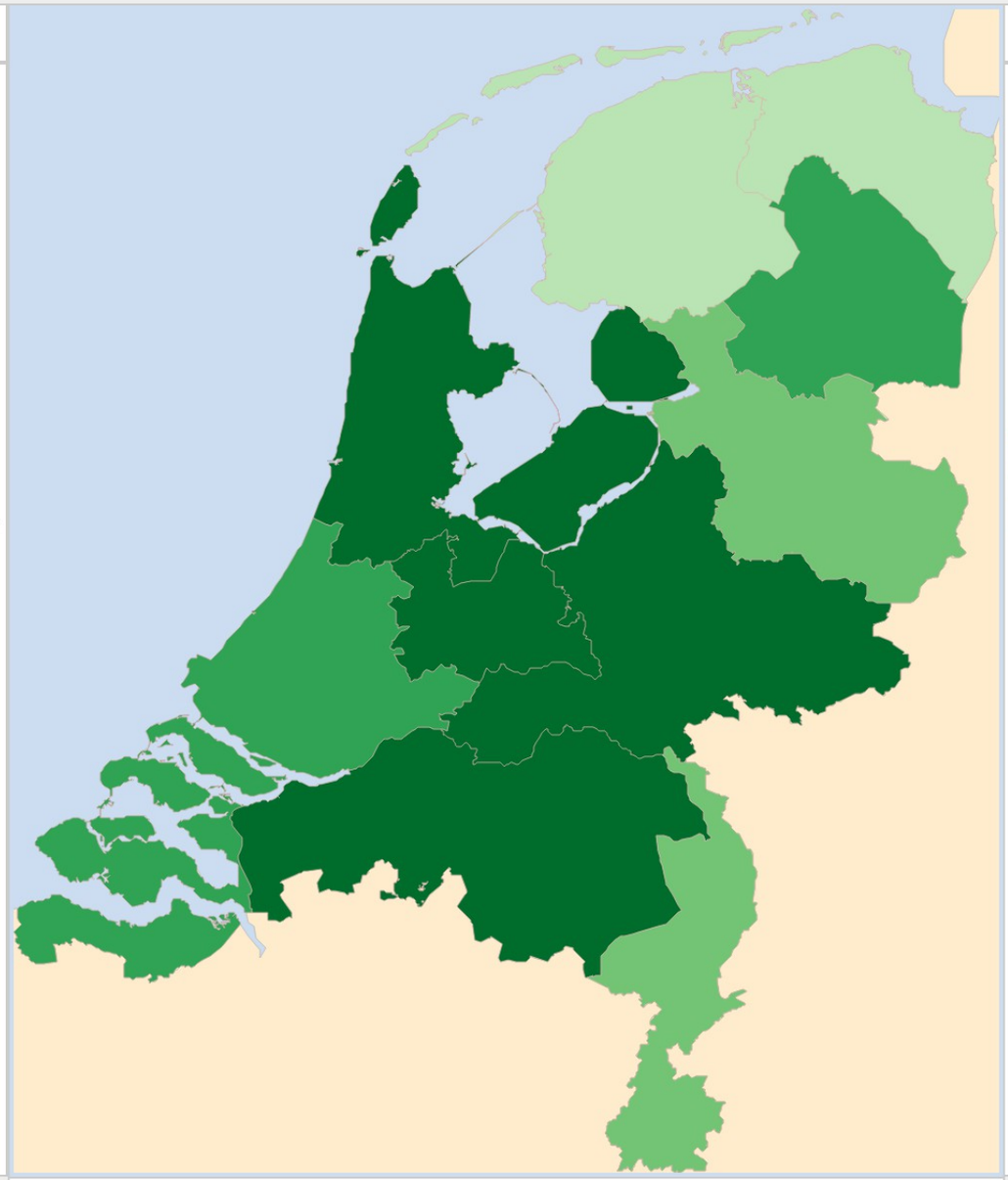
Economy

Average income per inhabitant

per province (2012)

thousand Euro:
- 27.8 – 27.8
- 27.8 – 32.0
- 32.0 – 33.3
- 33.3 – 33.9
- 33.9 – 36.1

Geodata: Kadaster
Attribute data: CBS StatLine



X-Position: Opacity: Swipe: Background: Show

COMPARE WITH...

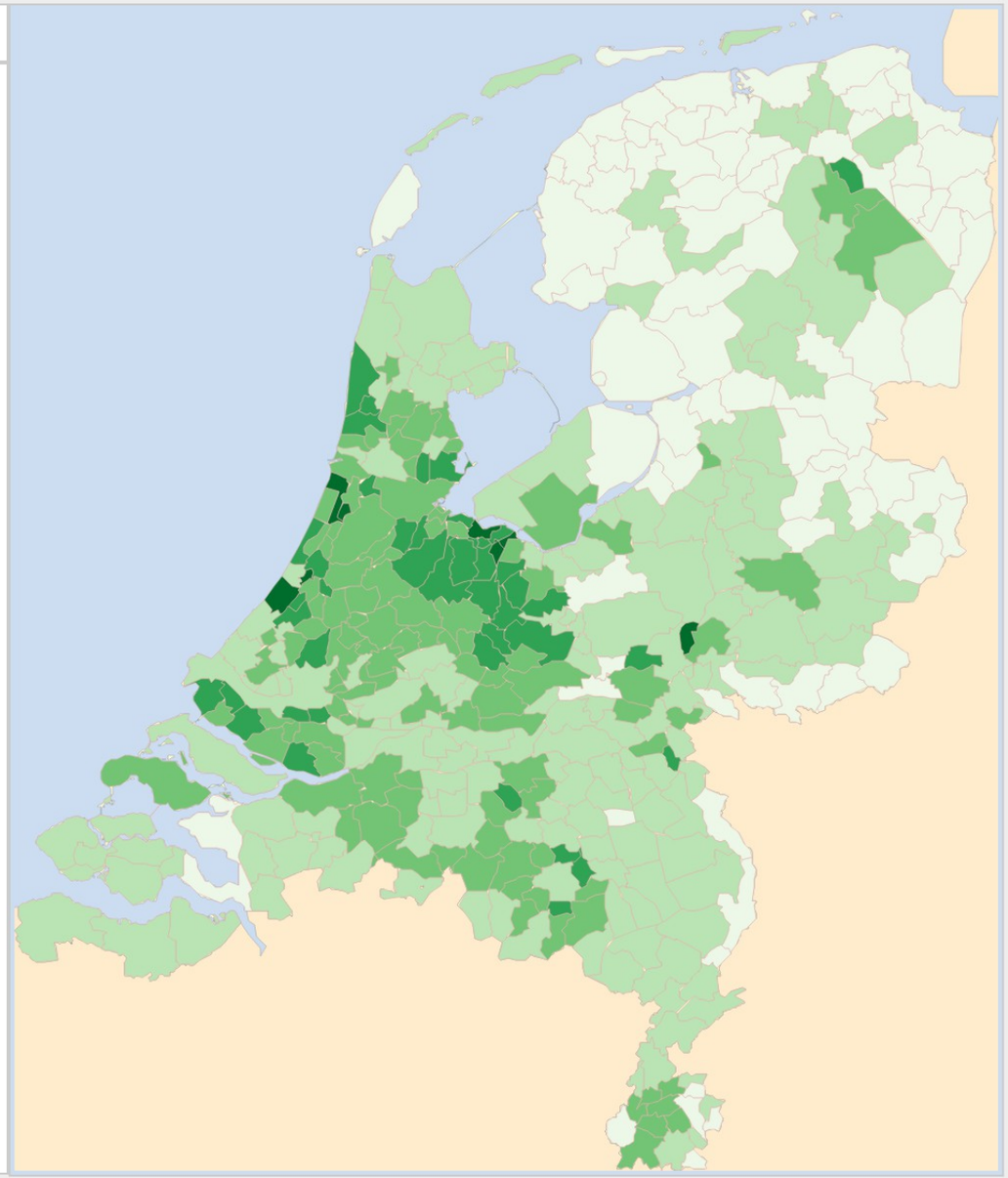
Economy

Average income per inhabitant

per municipality (2013)

thousand Euro:
- 15.6 – 20.6
- 20.6 – 22.7
- 22.7 – 25.3
- 25.3 – 30.3
- 30.3 – 36.1

Geodata: Kadaster
Attribute data: CBS StatLine



TRANSPARENCY

CHOOSE Reload this page

Economy

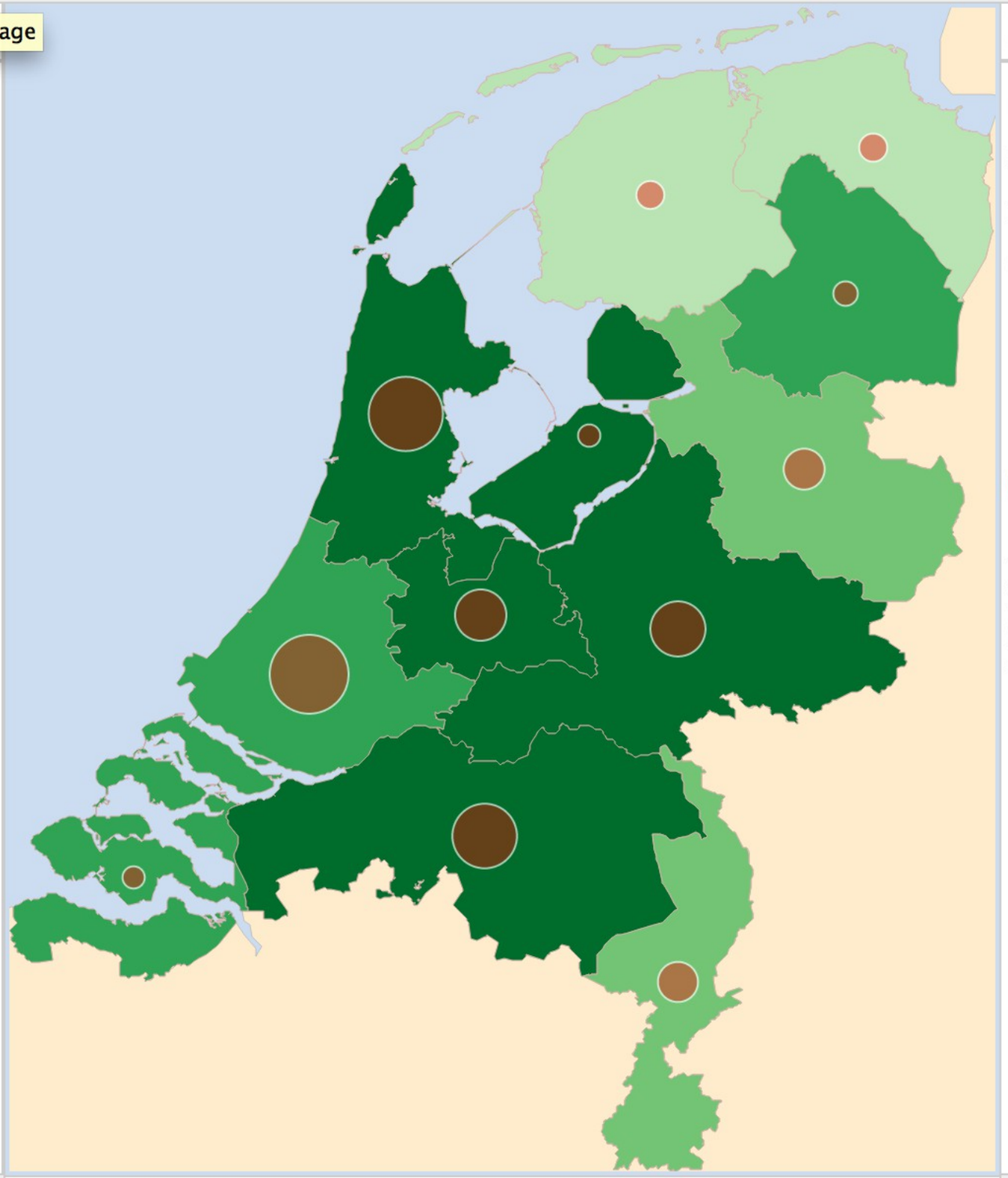
Average income per inhabitant

per province (2012)

thousand Euro:

- 27.8 – 27.8
- 27.8 – 32.0
- 32.0 – 33.3
- 33.3 – 33.9
- 33.9 – 36.1

Geodata: Kadaster
Attribute data: CBS StatLine
©2011-15: Foundation Scientific Atlas of the Netherlands



COMPARE WITH...

Economy

Salaries total

per province (2012)

million Euro:

- 0
- 23855
- 47710
- 71565

Geodata: Kadaster
Attribute data: CBS StatLine
©2011-15: Foundation Scientific Atlas of the Netherlands

X-Position: Opacity: Swipe: Background: Show

SWIPE

CHOOSE MAP...

Economy

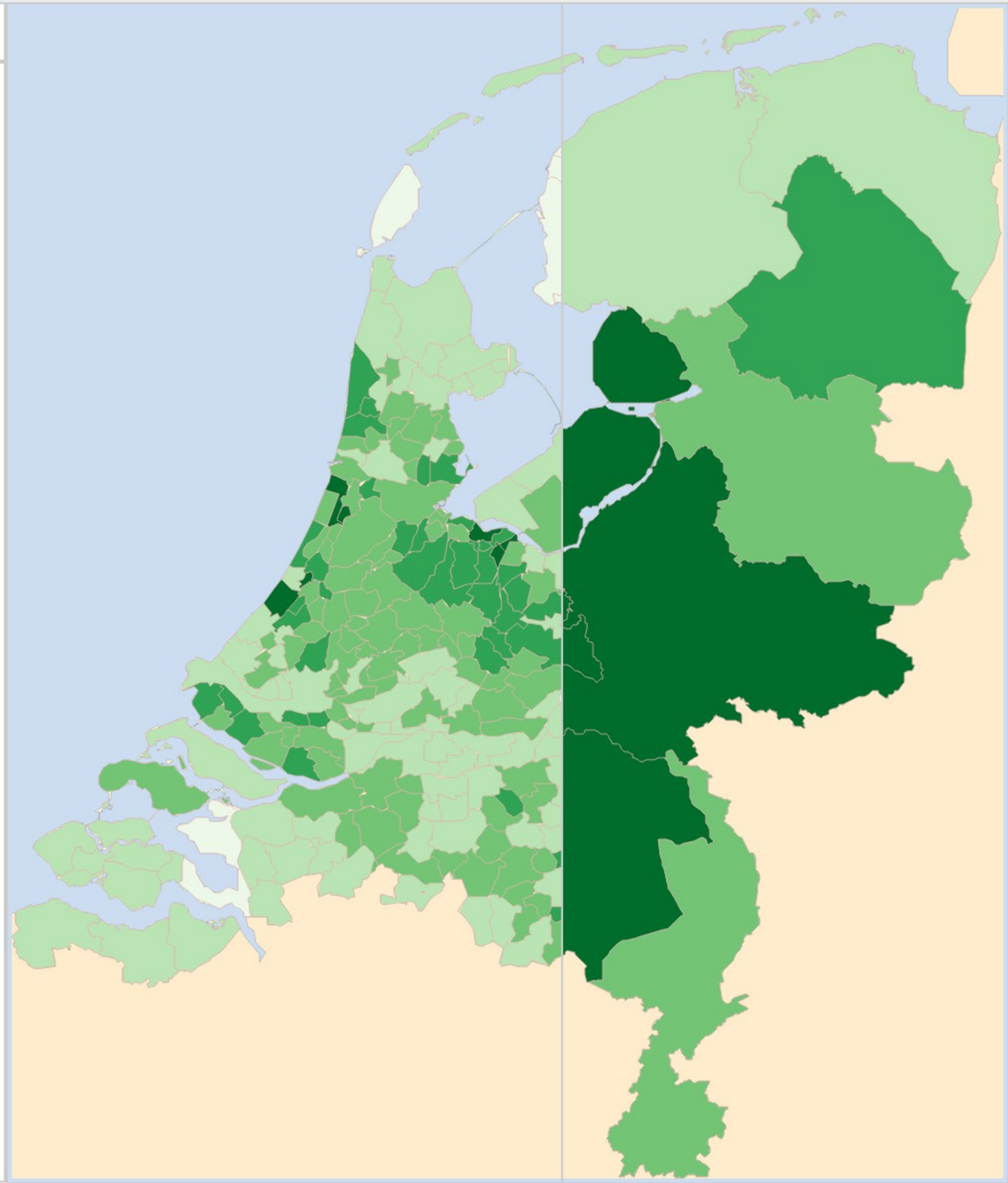
Average income per inhabitant

per province (2012)

thousand Euro:

- 27.8 – 27.8
- 27.8 – 32.0
- 32.0 – 33.3
- 33.3 – 33.9
- 33.9 – 36.1

Geodata: Kadaster
Attribute data: CBS StatLine
©2011-15: Foundation Scientific Atlas of the Netherlands



COMPARE WITH...

Economy

Average income per inhabitant

per municipality (2013)

thousand Euro:

- 15.6 – 20.6
- 20.6 – 22.7
- 22.7 – 25.3
- 25.3 – 30.3
- 30.3 – 36.1

Geodata: Kadaster
Attribute data: CBS StatLine
©2011-15: Foundation Scientific Atlas of the Netherlands

X-Position: Opacity: Swipe: Background: Show

How does it ACTUALLY work?

THE TECHNOLOGY

How does it ACTUALLY work?

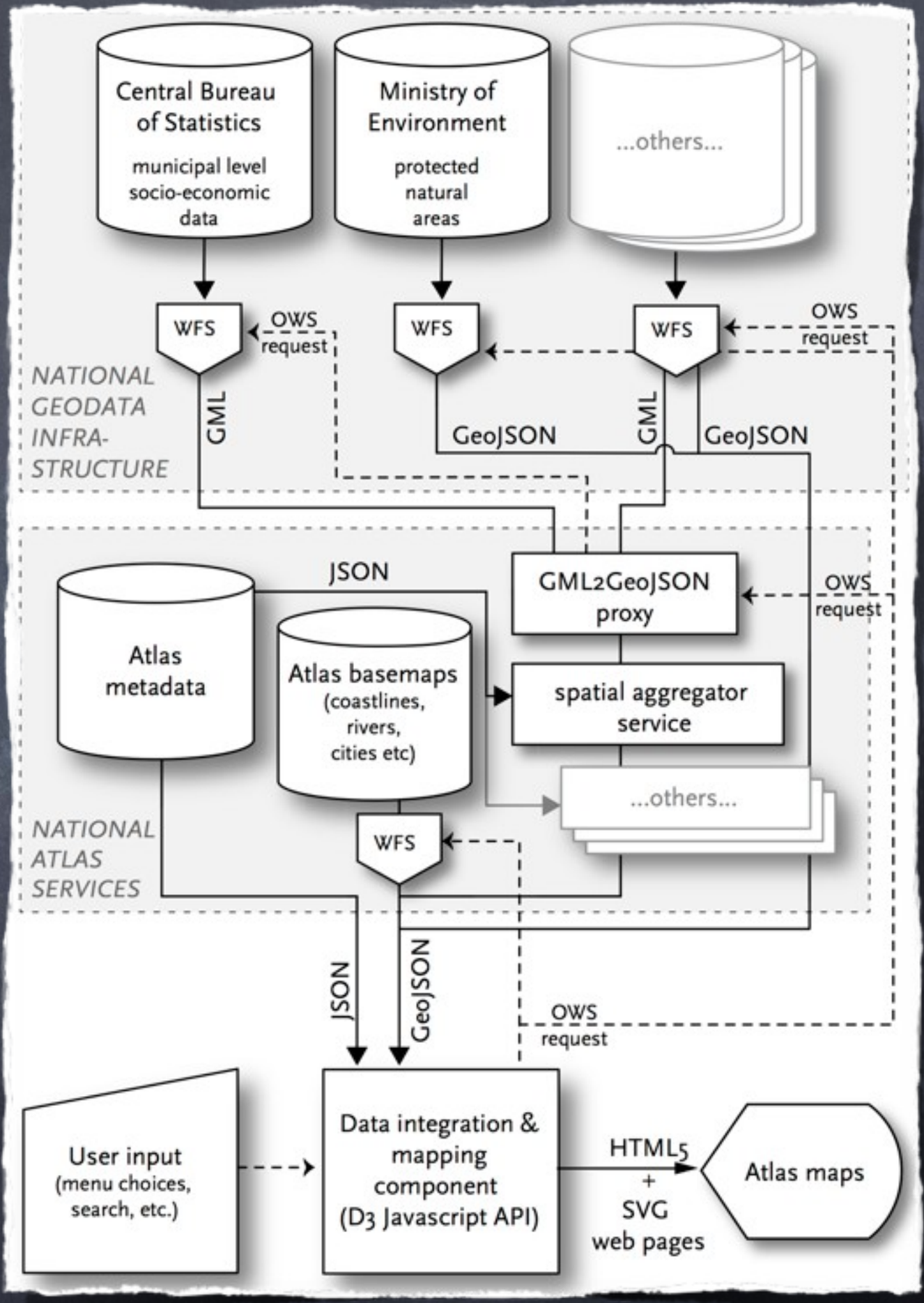
THE TECHNOLOGY

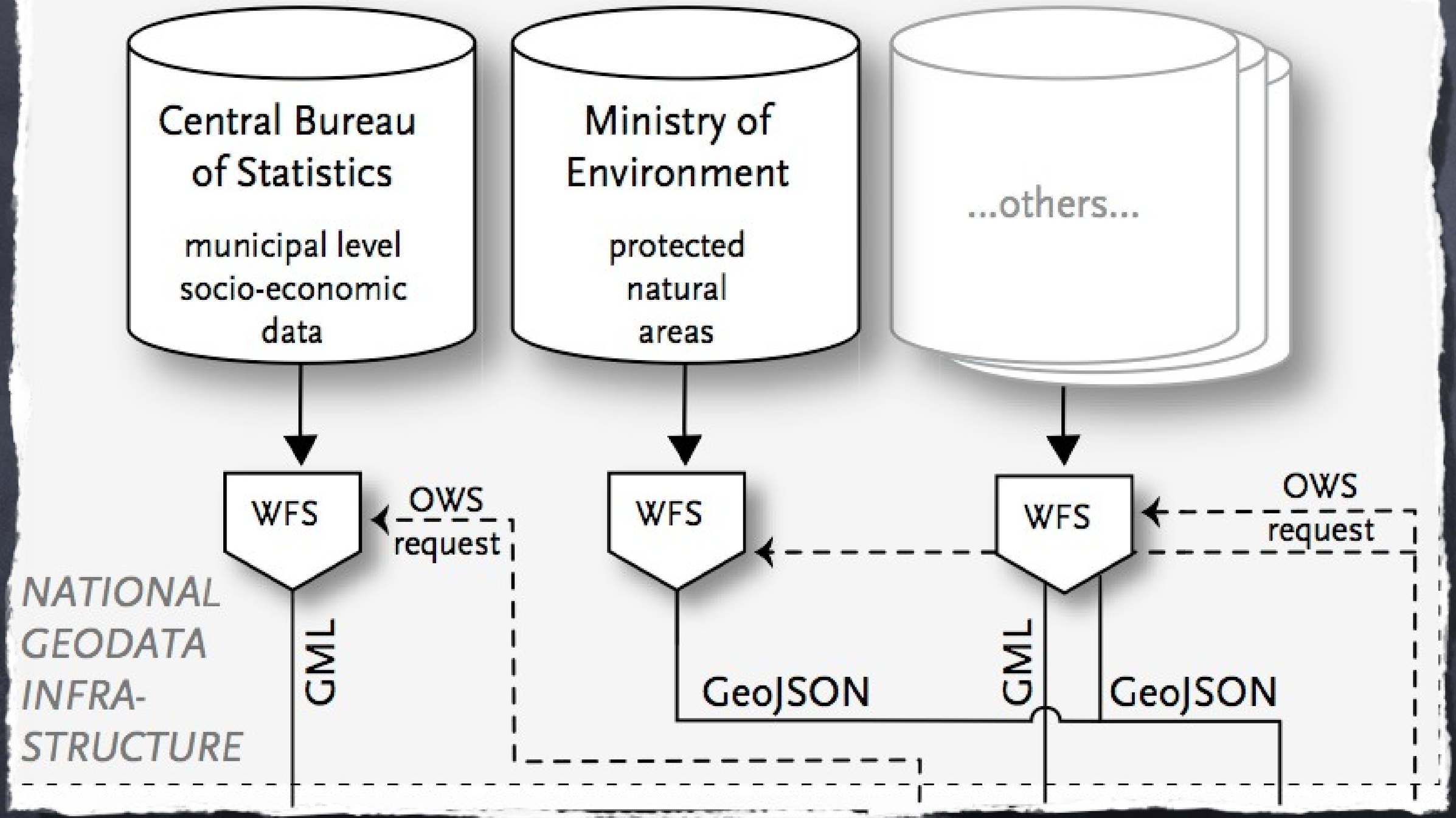
also is building further on the

NATIONAL ATLAS IN SDI

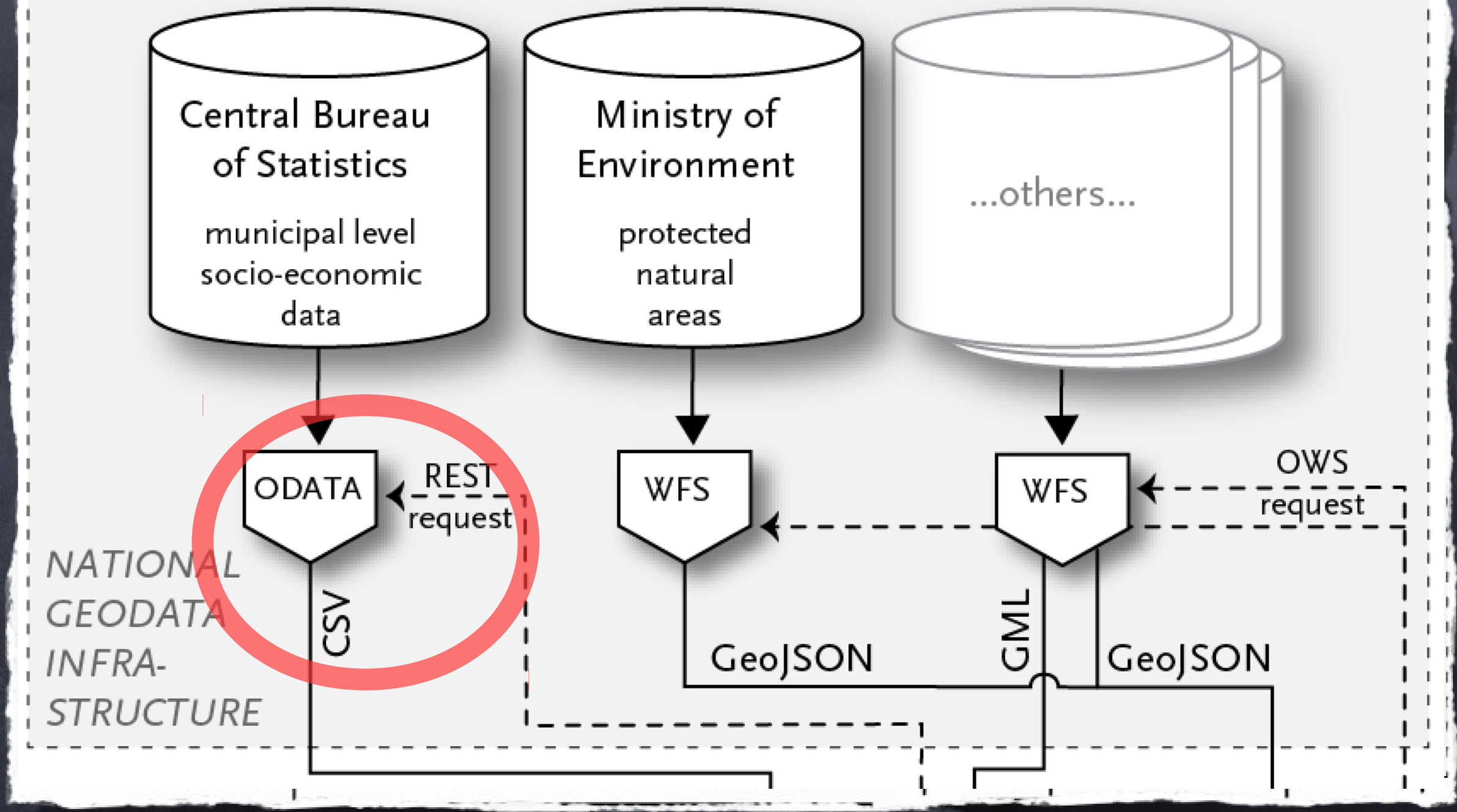
prototype

Architecture overview

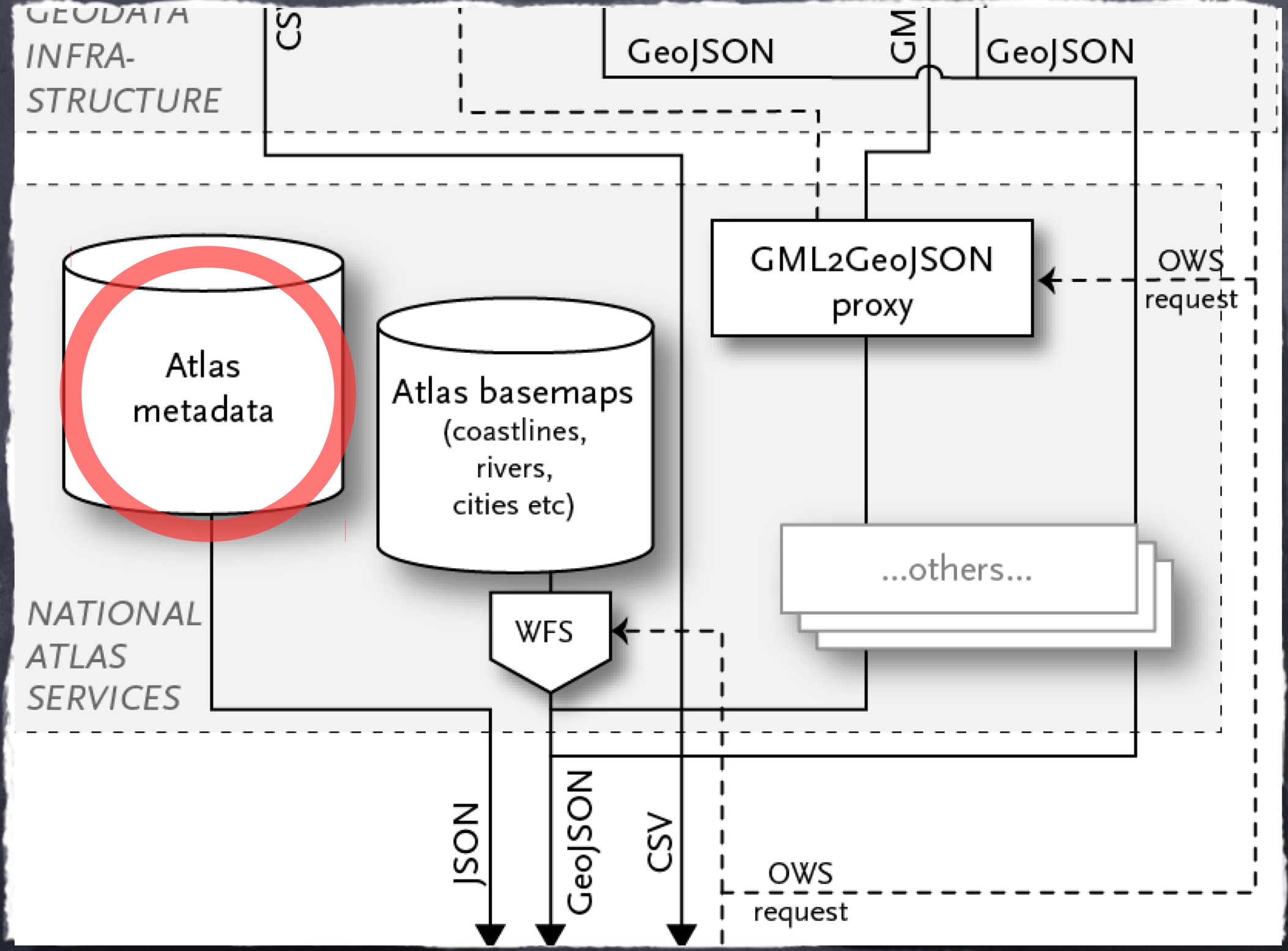




- use data services (WFS) requests
- GeoJSON output where possible



- use data services (WFS or REST) requests
- GeoJSON or CSV data output



ATLAS utility services & basedata

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"name": [
  "Bevolkings-dichtheid",
  "Population Density"
],
"data_unit": [
  "inwoners per km2",
  "inhabitants per km2"
],
"mapunits": [
  {
    "name": [
      "gemeente",
      "municipality"
    ],
    "mapdates": [
      {
        "date": "2011",
        "geo_data": 0,
        "attrib_data": 0,
        "FK": "GM_CODE",
        "attrib": "BEV_DICHTH",
        "label": "GM_NAAM"
      },{
        "date": "2013",
        "geo_data": 2,
        "attrib_data": 2,
        "FK": "GM_CODE",
        "attrib": "BEV_DICHTH",
        "label": "GM_NAAM"
      }
    ]
  }
],
"maptype": "area_value",
"classification": {
  "type": "manual",
  "colours": "Greens",
  "numclasses": "5",
  "classes": [0,400,800,1600,3200,6400],
```

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"geo_sources": [
  {
    "unitname": [
      "gemeente",
      "municipality"
    ],
    "description": [
      "Gegeneraliseerde gemeentegrenzen afkomstig uit de Basis
      "Municipalities of the Netherlands, generalised from the
    ],
    "date": "2011",
    "FK_attrib": "GM_CODE",
    "source": [
      "Kadaster",
      "Kadaster"
    ],
    "serviceType": "localfile",
    "serviceURL": "./data/gemeenten/geo.topojson",
    "serviceTypeName": "",
    "serviceOutputFormat": "topojson"
  },
```
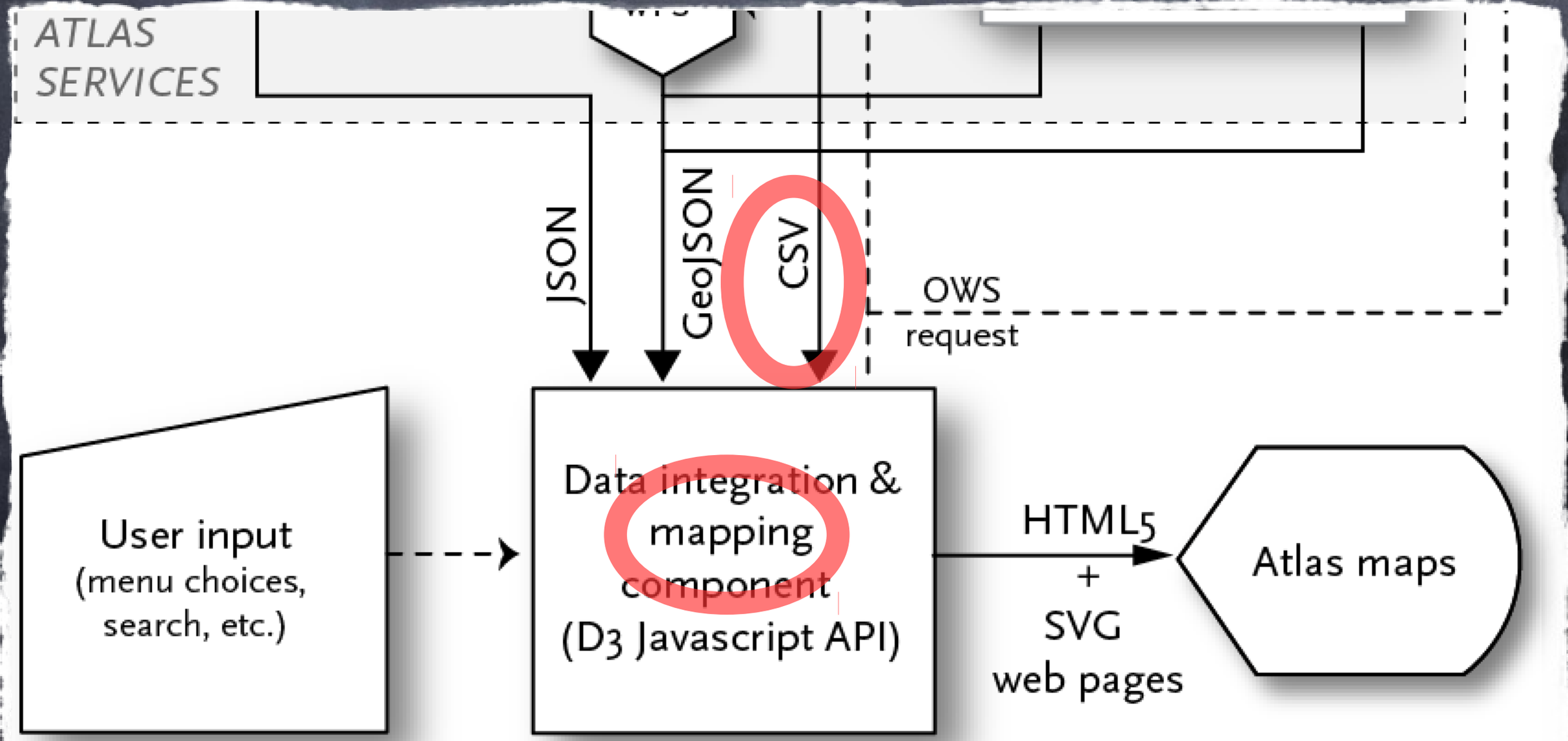

Atlas Viewer:
- based on the Open Web Platform:
HTML5 + SVG + CSS +JavaScript
- uses D3 library



FUTURE WORK

Practical:

- make “compare to…” chooser context aware
- add more comparison methods
- add more Open Data connectors
- etc., etc…

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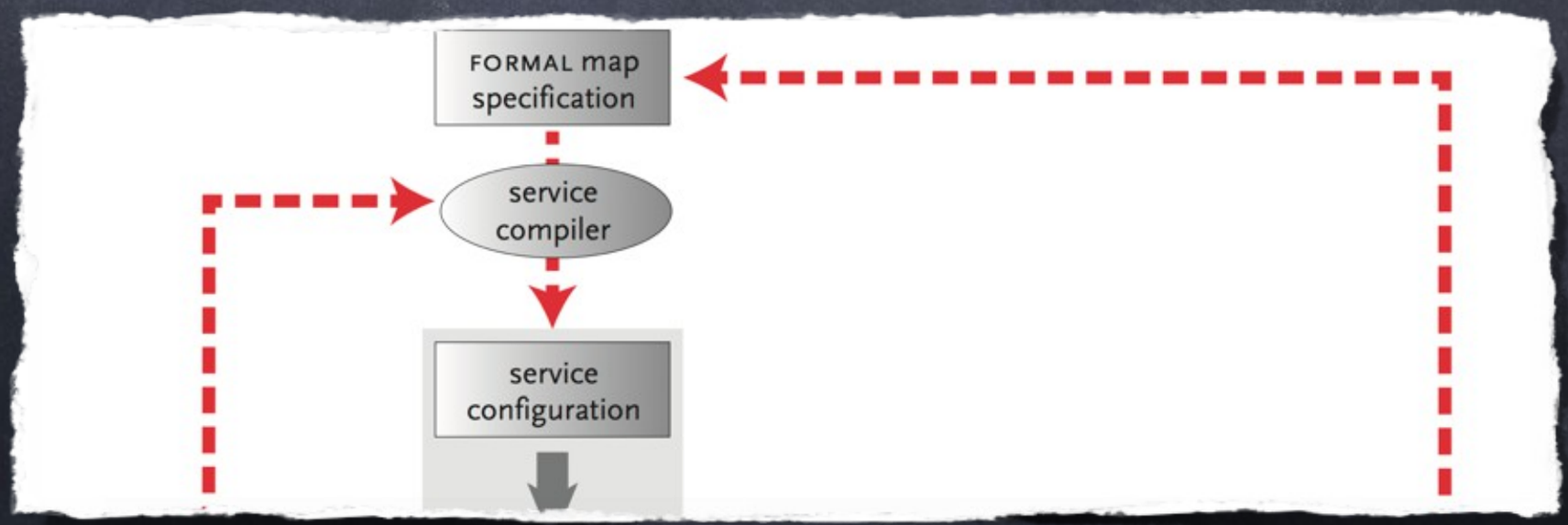
Theoretical:

- formalising map specifications for further automating thematic map creation



Thank you!

http://www.nationaleatlas.nl

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