# UNECE COVID-19 impact Transport Statistics Activities, and Mapping Inland Water Transport Volumes

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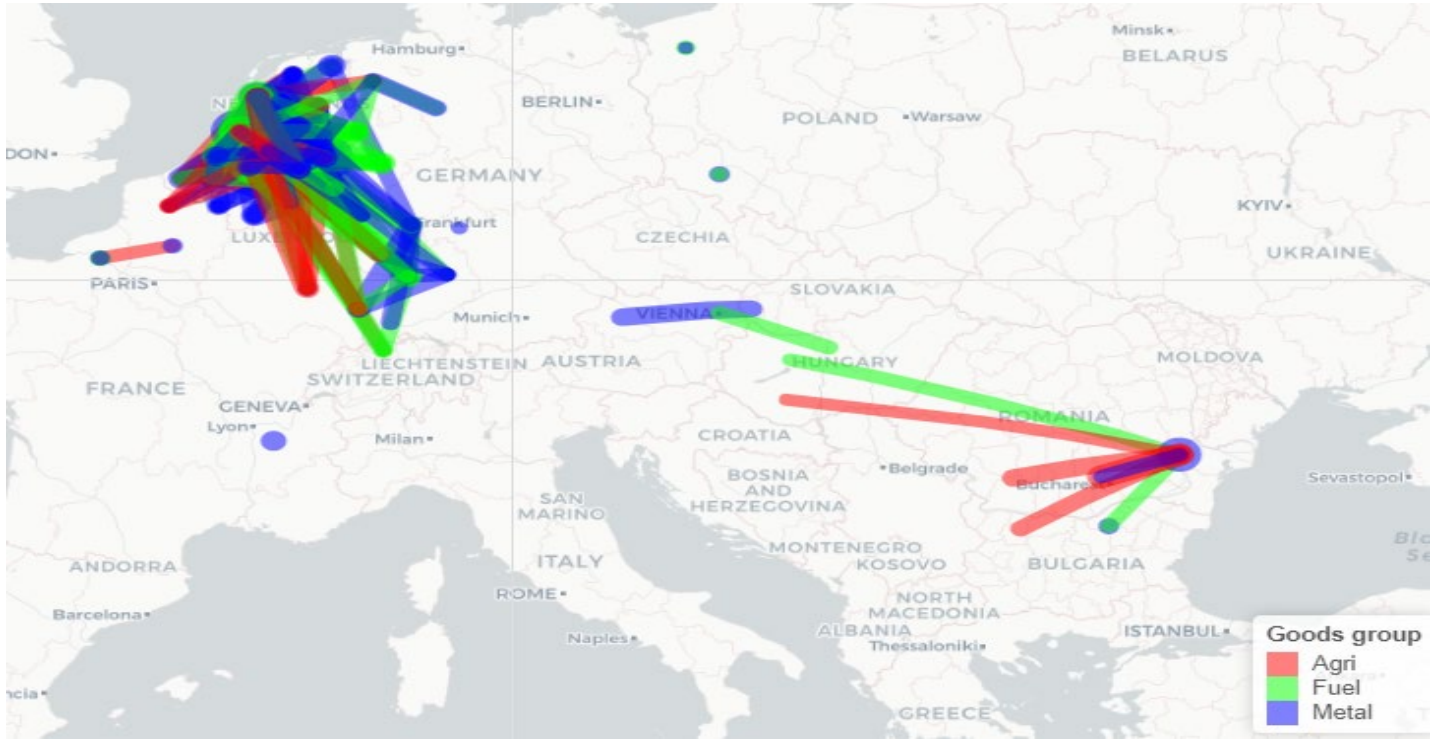
***Secretary, Working Party on Transport Statistics (WP.6)***

***Presentation to Working Party on Inland Water Transport. Geneva, 7-9 October 2020***



# Overview

- WP.6 activities in 2020: Focus on short-term data and new sources to track COVID-19 impacts
- Attempts at visualizing inland water transport volumes with existing data, to create census-style maps

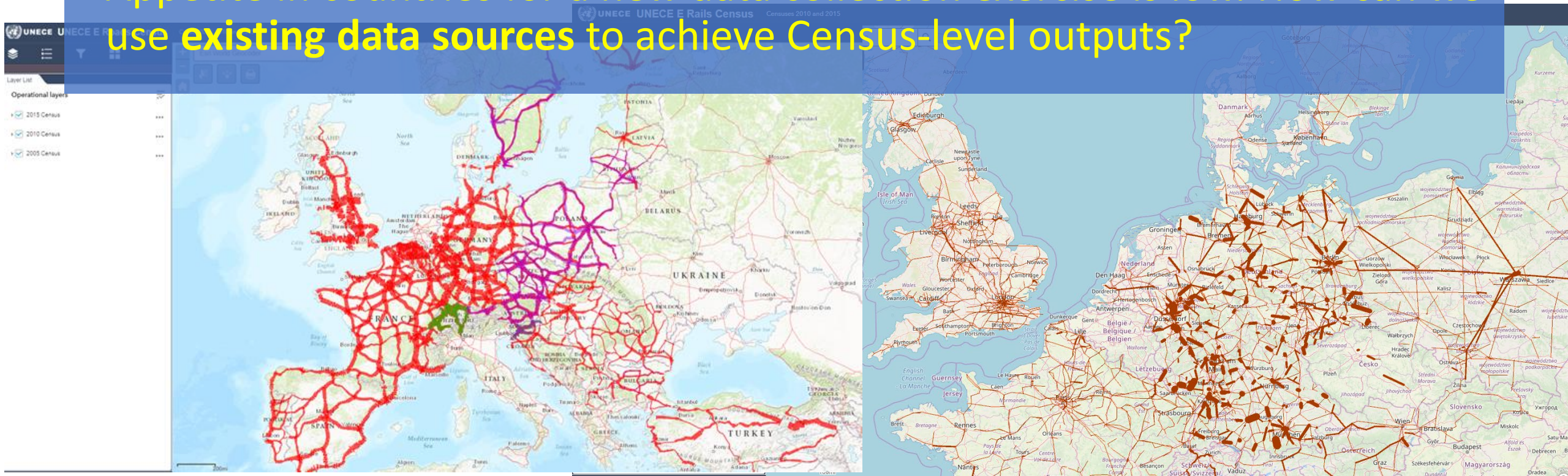
# Data Collation on COVID19 transport impacts

- To maintain relevance, we wanted quick data from **official sources** on a fast evolving situation. This included provisional data and experimental statistics.
- Waiting 20 months for official, annual data will not help. An emergency questionnaire would not have been popular.
- Data collated and published at https://wiki.unece.org/display/DSOCIOT/Data+Sources+on+Coronavirus+impact+on+transport.
- Not much inland water data available (only Belarus has monthly data), but some countries are publishing port indicators.
- Know any relevant sources for Inland water data? Tell us.

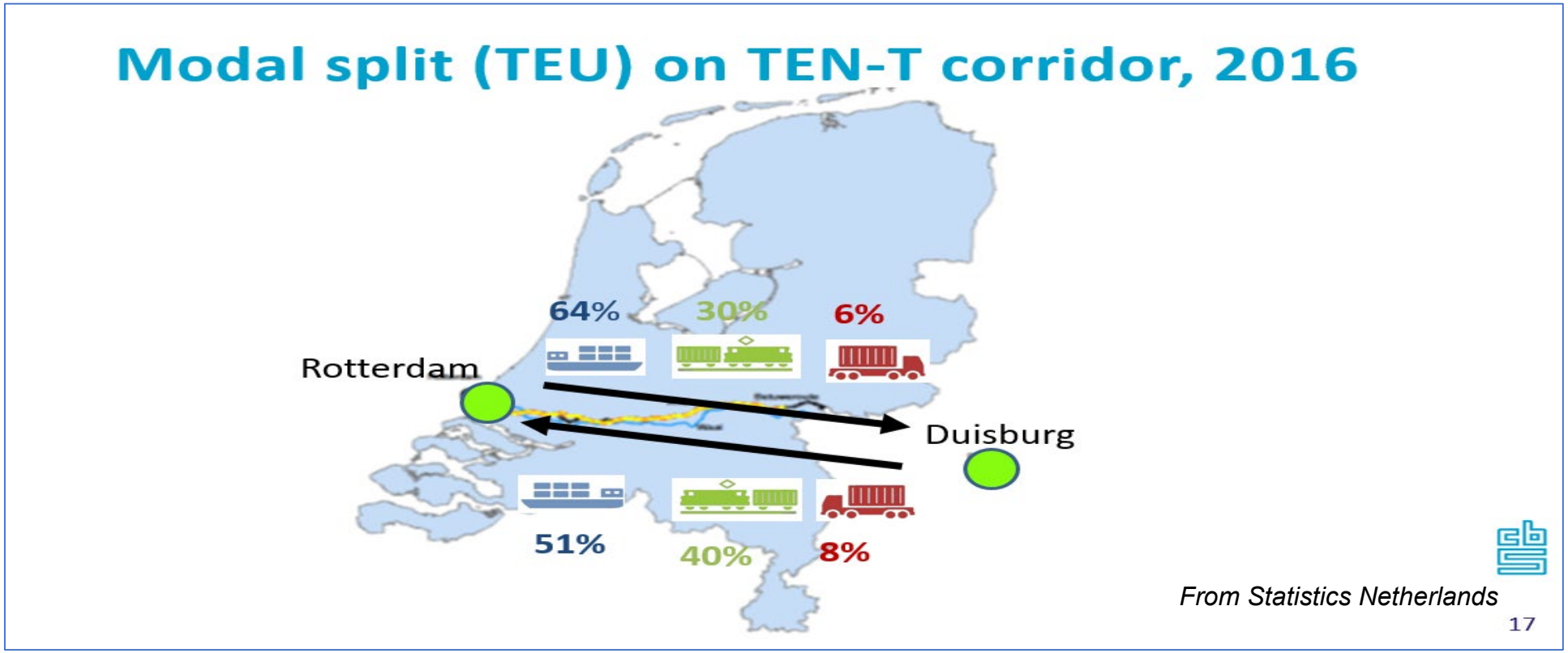
COVID-19 RESPONSE

# Background on Censuses

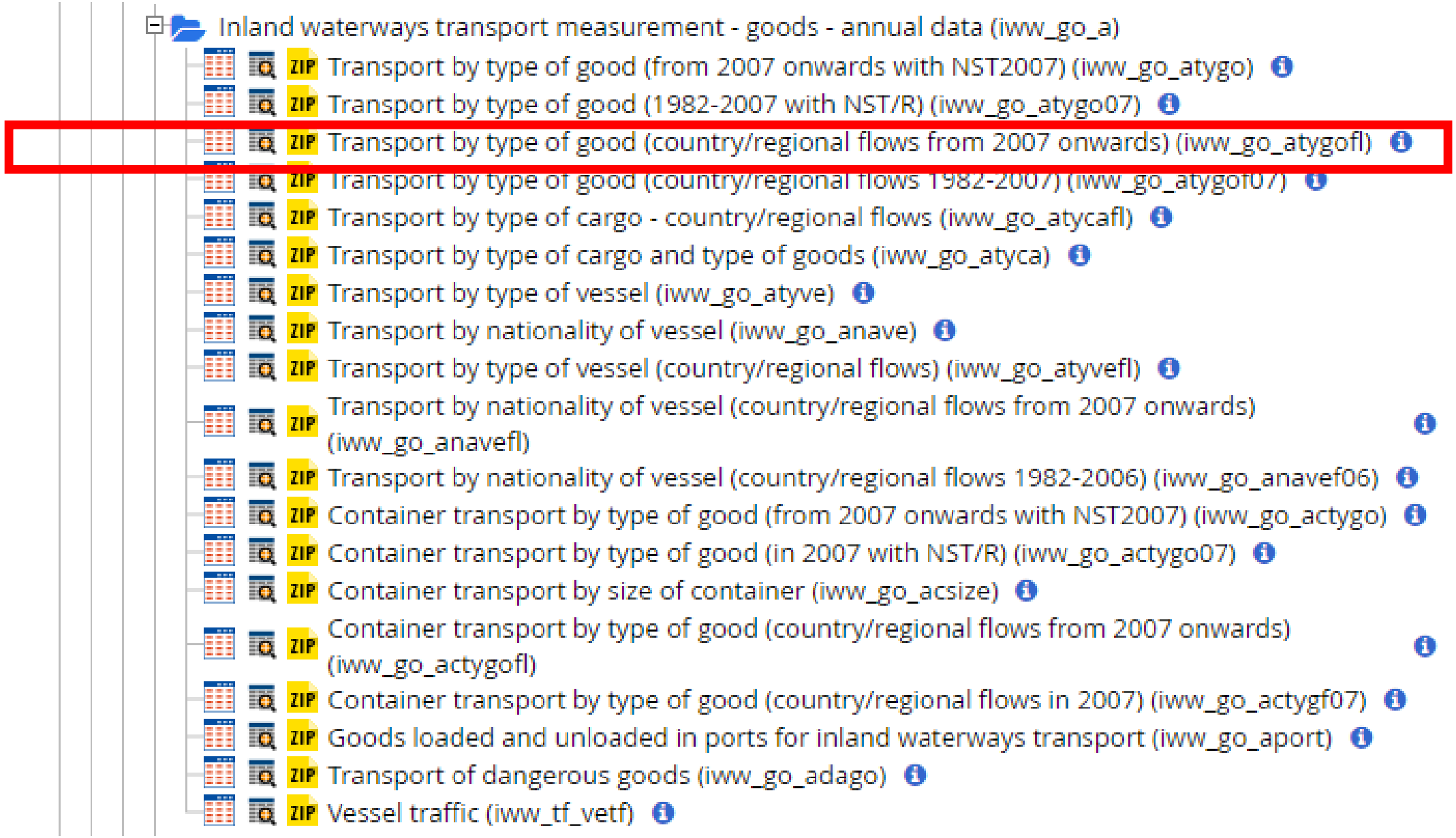
- UNECE IWW data from the common questionnaire only has national-level tonnage and tonne-kilometre figures (broken down by national, international-loaded,international-unloaded and transit volumes).
- SC3 and WP.6 have previously discussed idea of E-IWW census (similar to road+rail), to map transport volumes on the network itself.
- Appetite in countries for a new data collection exercise is low. How can we use **existing data sources** to achieve Census-level outputs?



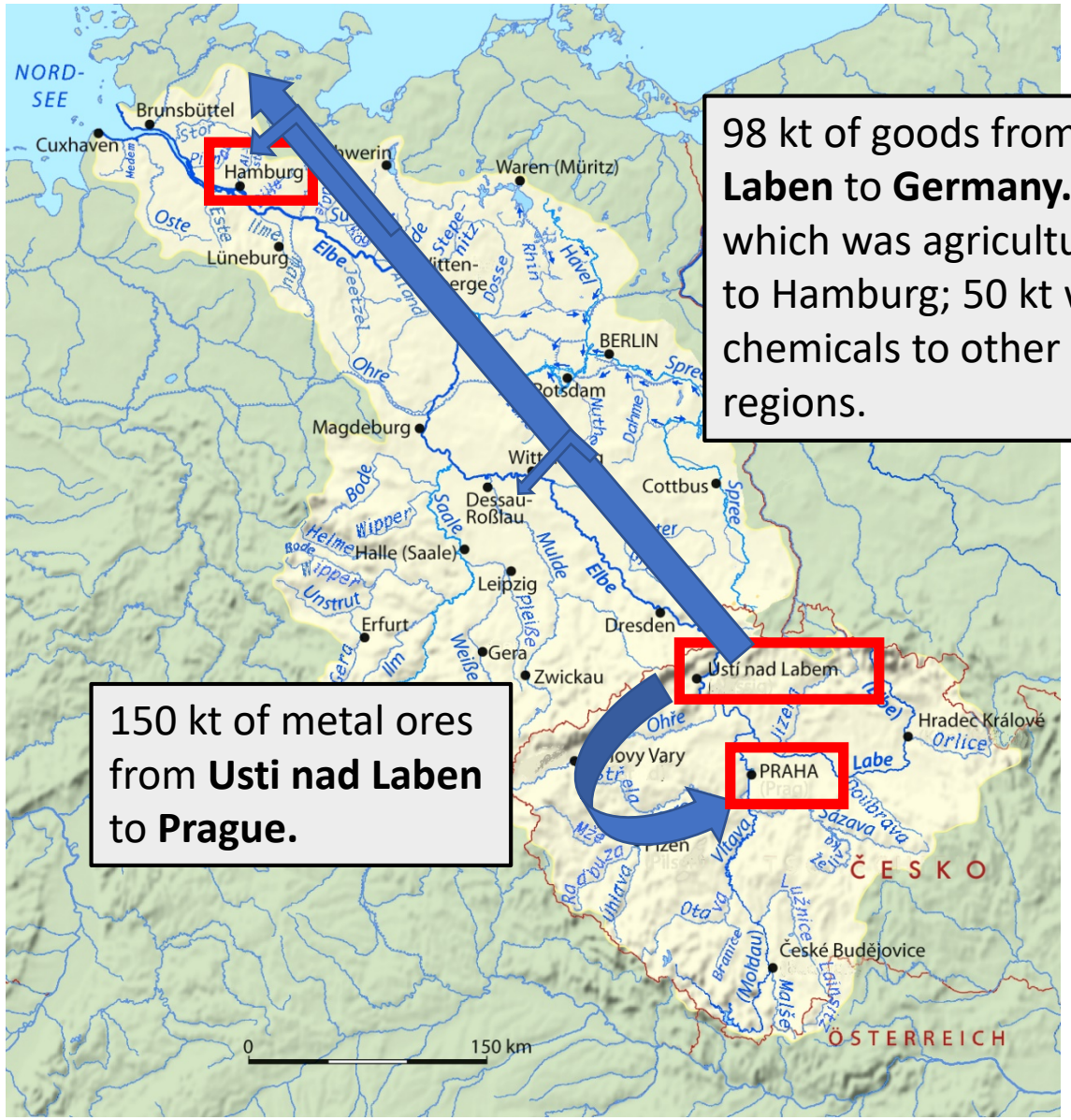
# Visualizing freight volumes



# Eurostat Data



# Existing Eurostat Data Are Very Detailed




98 kt of goods from **Usti nad Laben** to **Germany.** 41kt of which was agriculture products to Hamburg; 50 kt was chemicals to other German regions.

150 kt of metal ores from **Usti nad Laben** to **Prague.**

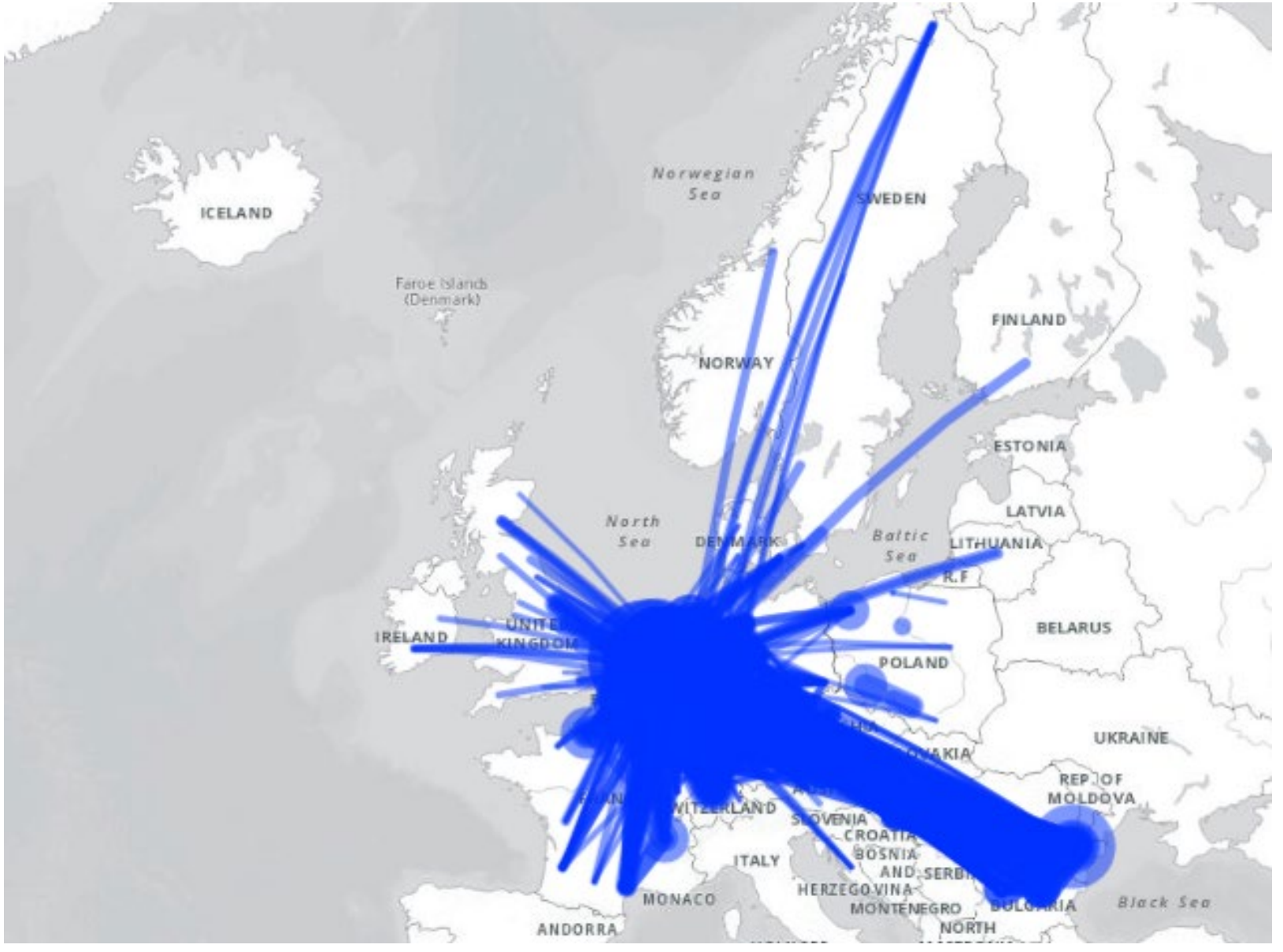
# Analysis

- 14 million data points means using Eurostat's browser or Excel not feasible.
- Data are by NUTS2 region. Names of each region are not always familiar. Lots of data cleaning required.
- NUTS2 Shapefiles are available for download, meaning the quantities can be visualized on a map (between region centroids). This is the focus of this analysis.

| C_LOAD | GEO | C_UNLOAD / NST07 | BE21 - Prov. Antwer | BE21 - Prov. Antwer | BE21 - Prov. Antwer | BE21 - Prov. Antwer | BE21 - Prov. Antwer | BE22 - Prov. Limburg | BE22 - Prov. Limburg |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total transported go | Products of agricultu | Cereals | Potatoes | Sugar beet | Total transported go | Products of agricultu |
| BE - Belgium | Belgium | | 20,610 | 513 | : | : | : | 5,144 | 7 |
| BE - Belgium | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE - Belgium | Netherlands | | 2,250 | 44 | 44 | : | : | 366 | : |
| BE1 - Région de Bruxelles- | Belgium | | 757 | : | : | : | : | 53 | : |
| BE1 - Région de Bruxelles- | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE1 - Région de Bruxelles- | Netherlands | | : | : | : | : | : | : | : |
| BE2 - Vlaams Gewest | Belgium | | 13,507 | 418 | : | : | : | 2,846 | 6 |
| BE2 - Vlaams Gewest | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE2 - Vlaams Gewest | Netherlands | | 1,967 | 38 | 38 | : | : | 301 | : |
| BE21 - Prov. Antwerpen | Belgium | | 8,648 | 136 | : | : | : | 2,116 | 2 |
| BE21 - Prov. Antwerpen | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE21 - Prov. Antwerpen | Netherlands | | 26 | : | : | : | : | 51 | : |
| BE22 - Prov. Limburg (BE) | Belgium | | 1,914 | 9 | : | : | : | 300 | : |
| BE22 - Prov. Limburg (BE) | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE22 - Prov. Limburg (BE) | Netherlands | | 95 | : | : | : | : | 196 | : |
| BE23 - Prov. Oost-Vlaande | Belgium | | 1,460 | 271 | : | : | : | 102 | 1 |
| BE23 - Prov. Oost-Vlaande | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE23 - Prov. Oost-Vlaande | Netherlands | | 1,641 | 36 | 36 | : | : | 45 | : |
| BE24 - Prov. Vlaams-Braba | Belgium | | 1,037 | 0 (n) | : | : | : | 308 | 4 |
| BE24 - Prov. Vlaams-Braba | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE24 - Prov. Vlaams-Braba | Netherlands | | : | : | : | : | : | : | : |
| BE25 - Prov. West-Vlaande | Belgium | | 448 | 1 | : | : | : | 19 | : |
| BE25 - Prov. West-Vlaande | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE25 - Prov. West-Vlaande | Netherlands | | 206 | 1 | 1 | : | : | 8 | : |
| BE3 - Région wallonne | Belgium | | 6,346 | 95 | : | : | : | 2,245 | 1 |
| BE3 - Région wallonne | Germany (until 1990 form | | : | : | : | : | : | : | : |
| BE3 - Région wallonne | Netherlands | | 283 | 6 | 6 | : | : | 66 | : |
| NL - Netherlands | Belgium | | 24,727 | 214 | : | : | : | 4,200 | 6 |
| NL - Netherlands | Germany (until 1990 form | | : | : | : | : | : | : | : |
| NL - Netherlands | Netherlands | | 22,531 | 187 | 187 | : | : | 3,167 | 15 |

# Total Volumes, Origin-Destination Pairs

- Total Volumes, Origin-Destination Pairs.
- All quantities above 1KT = too much information!
- Identifies *some* River-Sea shipping flows (depending on country classification)



# Total Volumes, Origin-Destination Pairs

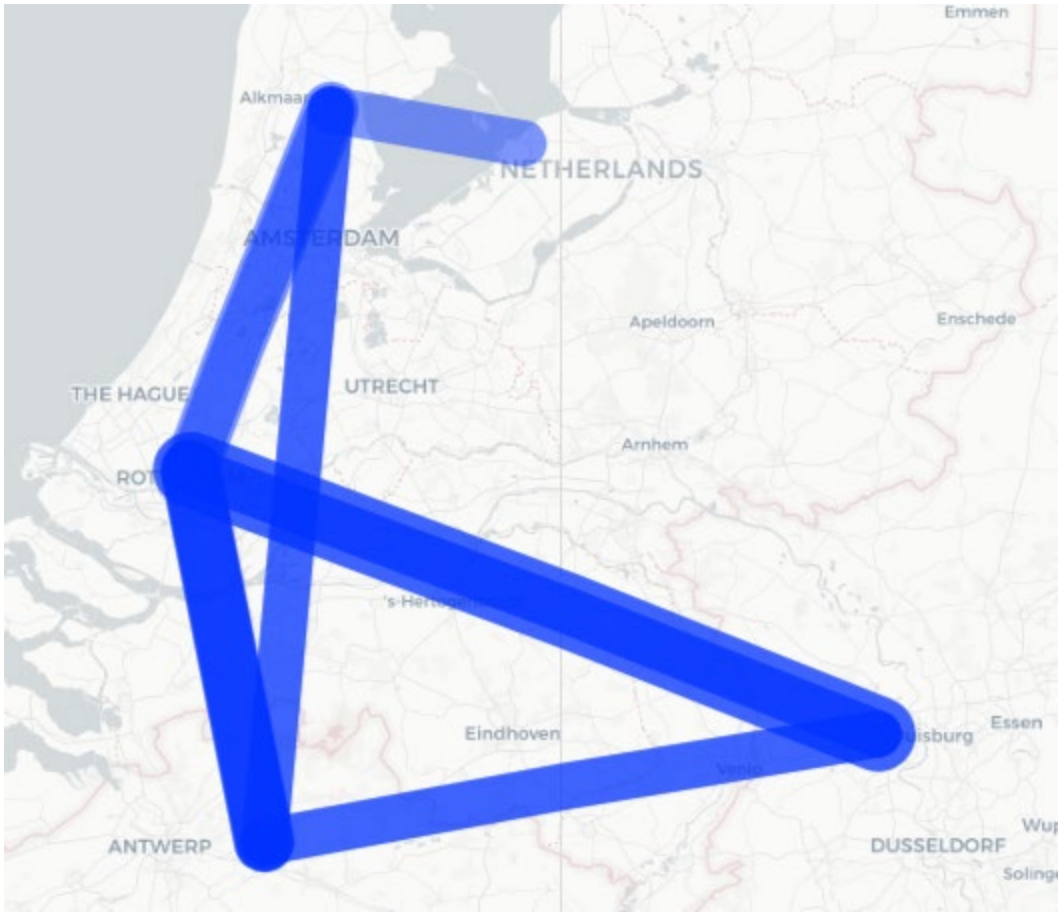
- All total flows above 100 thousand tonnes in 2018
- Summary: most traffic is on Rhine and Danube (!). Still too busy to provide much insight.

# Total Volumes, Origin-Destination Pairs

- All total flows above 2 million tonnes in 2018

# Total Volumes, Origin-Destination Pairs

- All total flows above 5 million tonnes in 2018
- Danube delta, and Amsterdam/Rotterdam/Antwerp/Duisburg traffic

# Next challenge: map type of goods.

- NST2007 has 16 classifications. Perhaps too detailed to be useful visually

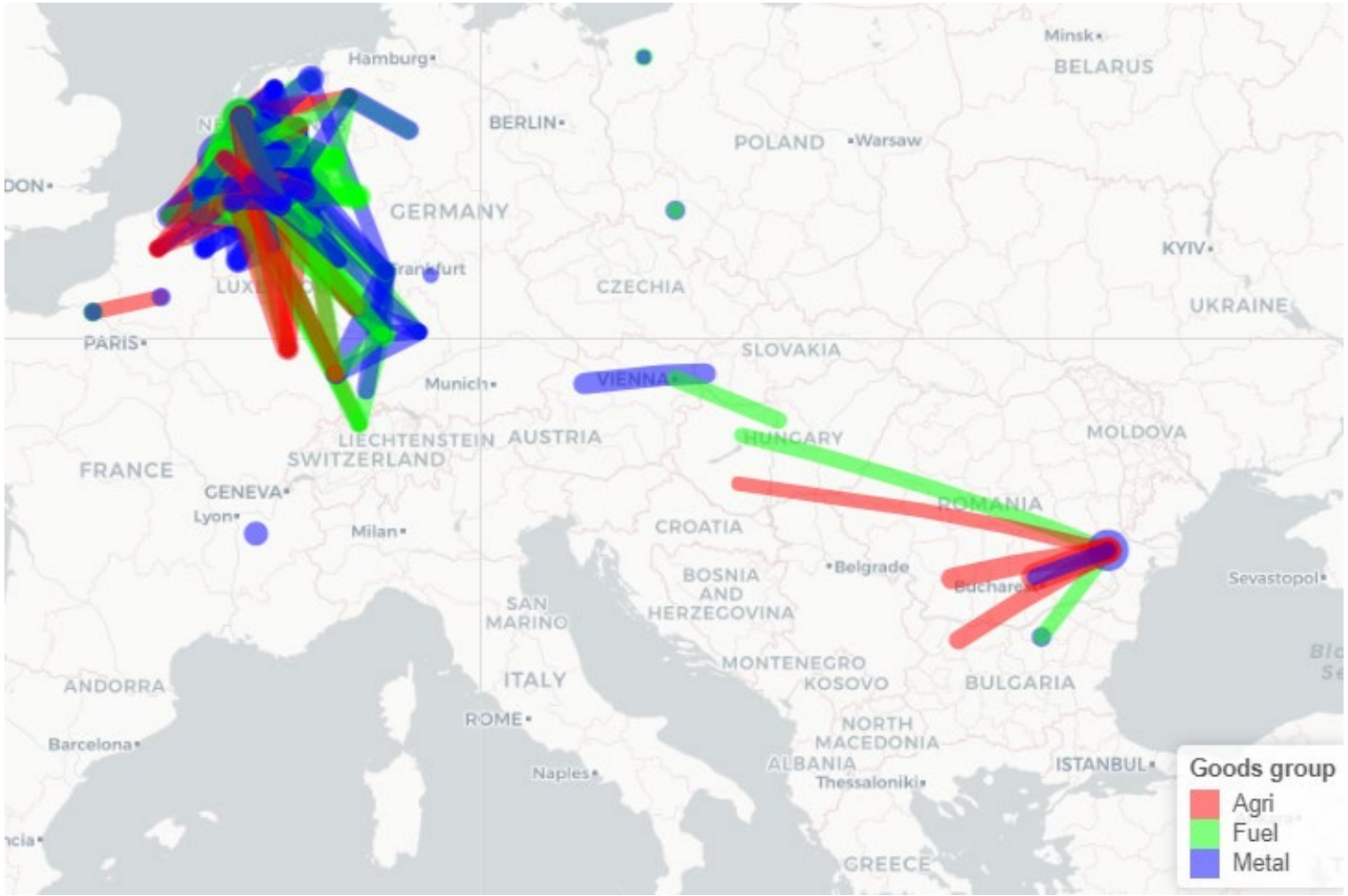
# Type of Goods Summarized

| | |
|---|---|
| GT01 | Products of agriculture, hunting, and forestry; fish and other fishing products |
| GT02 | Coal and lignite; crude petroleum and natural gas |
| GT03 | Metal ores and other mining and quarrying products; peat; uranium and thorium |
| GT04 | Food products, beverages and tobacco |
| GT05 | Textiles and textile products; leather and leather products |
| GT06 | Wood and products of wood and cork (except furniture); articles of straw and plaiting materials; pulp, paper and paper products; printed matter and. |
| GT07 | Coke and refined petroleum products |
| GT08 | Chemicals, chemical products, and man-made fibers; rubber and plastic products ; nuclear fuel |
| GT09 | Other non metallic mineral products |
| GT10 | Basic metals; fabricated metal products, except machinery and equipment |
| GT11 | Machinery and equipment n.e.c.; office machinery and computers; electrical machinery and apparatus n.e.c.; radio, television and communication e |
| GT12 | Transport equipment |
| GT13 | Furniture; other manufactured goods n.e.c. |
| GT14 | Secondary raw materials; municipal wastes and other wastes |
| GT15 | Mail, parcels |
| GT16 | Equipment and material utilized in the transport of goods |

| | |
|---|---|
| GT02+GT07 | Fuel |
| GT01+GT04 | Agriculture, wood and food |
| GT03+GT10+GT11 | metals, metal products and machinery |
| GT05+GT06 | Textiles, wood and wood products |
| GT08+GT09 | Chemicals and Minerals |
| GT12 | Transport equipment |

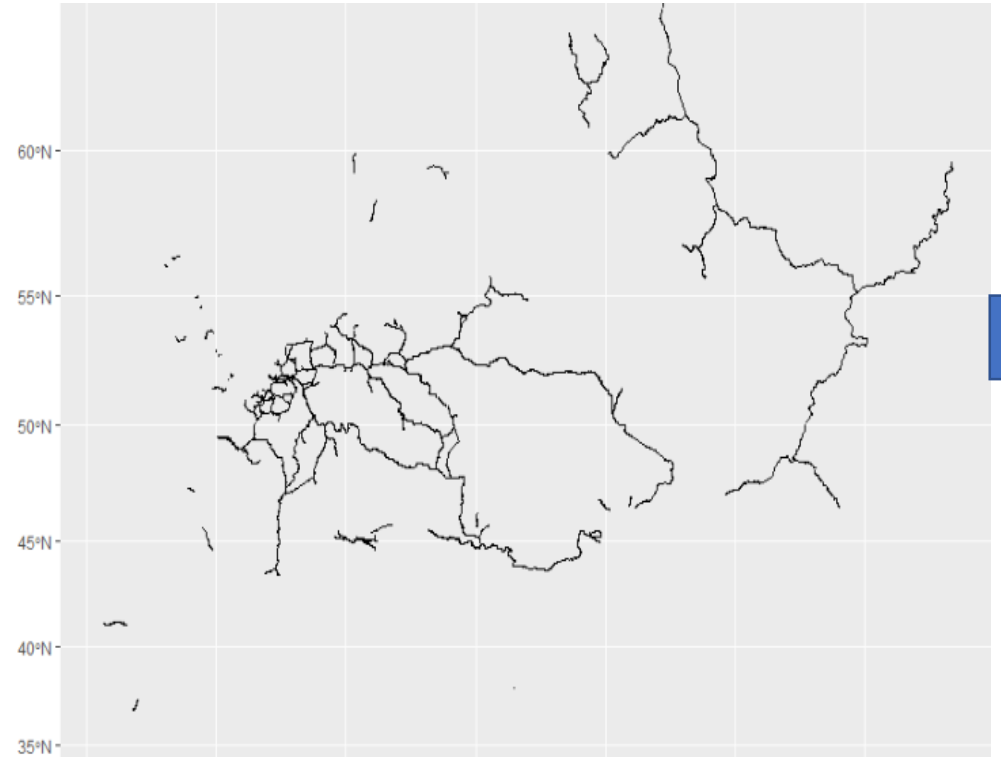
# Map type of goods grouped

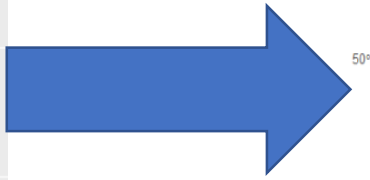
- All grouped good pairs >250,000 tonnes in 2018.

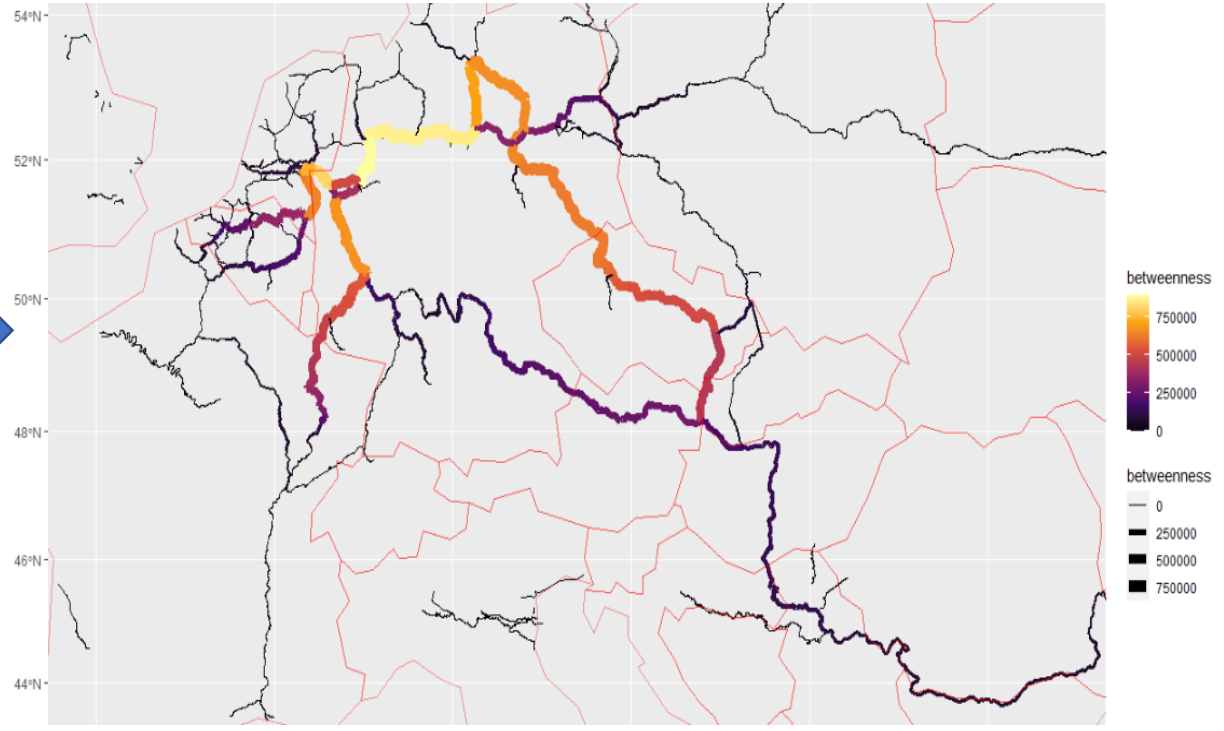


# Mapping origin-destination lines onto the real network

- We have the Blue Book Inland Waterway Network as a Shapefile.
- But… a Shapefile is not a network. “Line features do not know what they are connected to, but network elements do.”
- Code is available for turning a Shapefile to a network with nodes and edges. Distances between any two nodes can then be calculated. NUTS2 origin/destinations can then be applied to the network by connecting them to their nearest node. This will obviously not always follow reality.





# (Partial) Success

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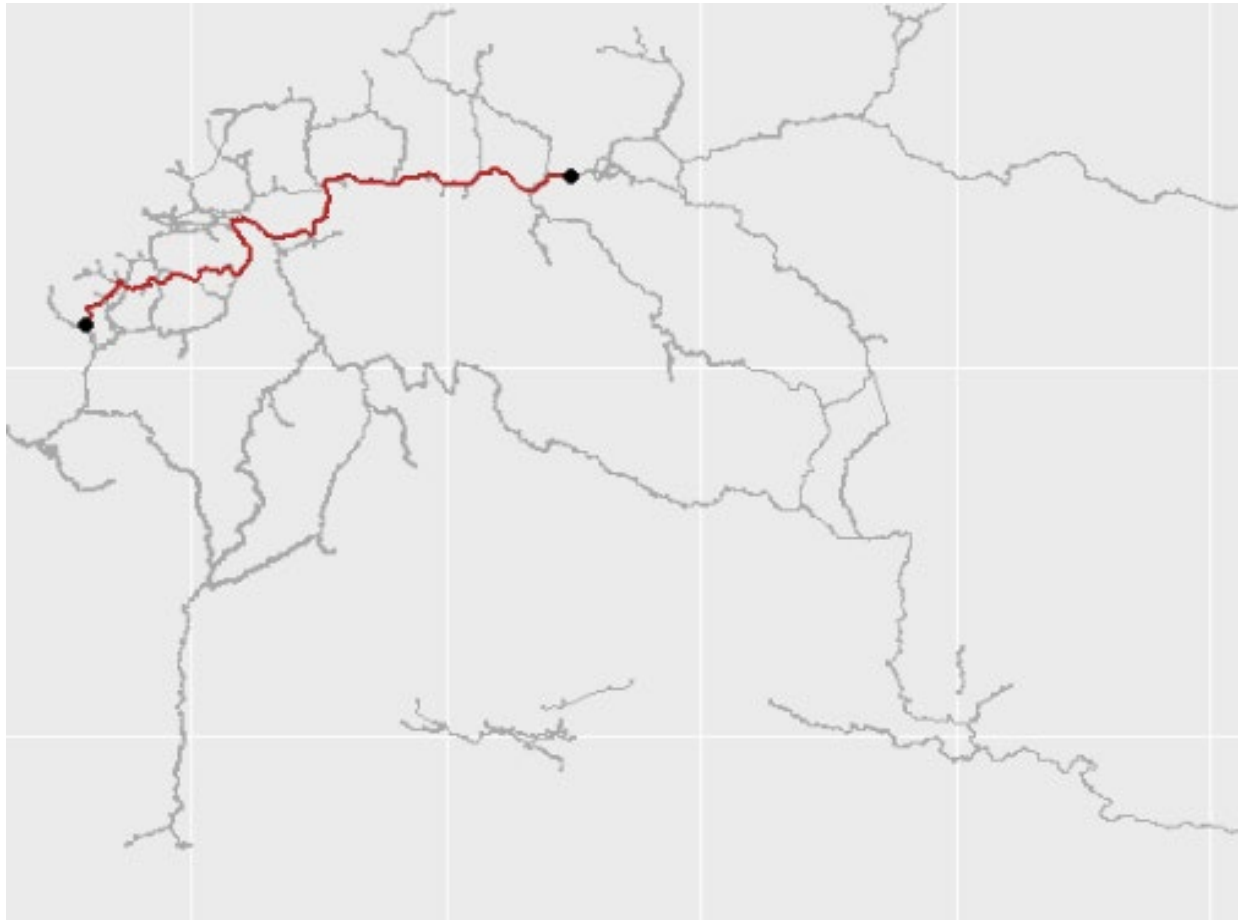
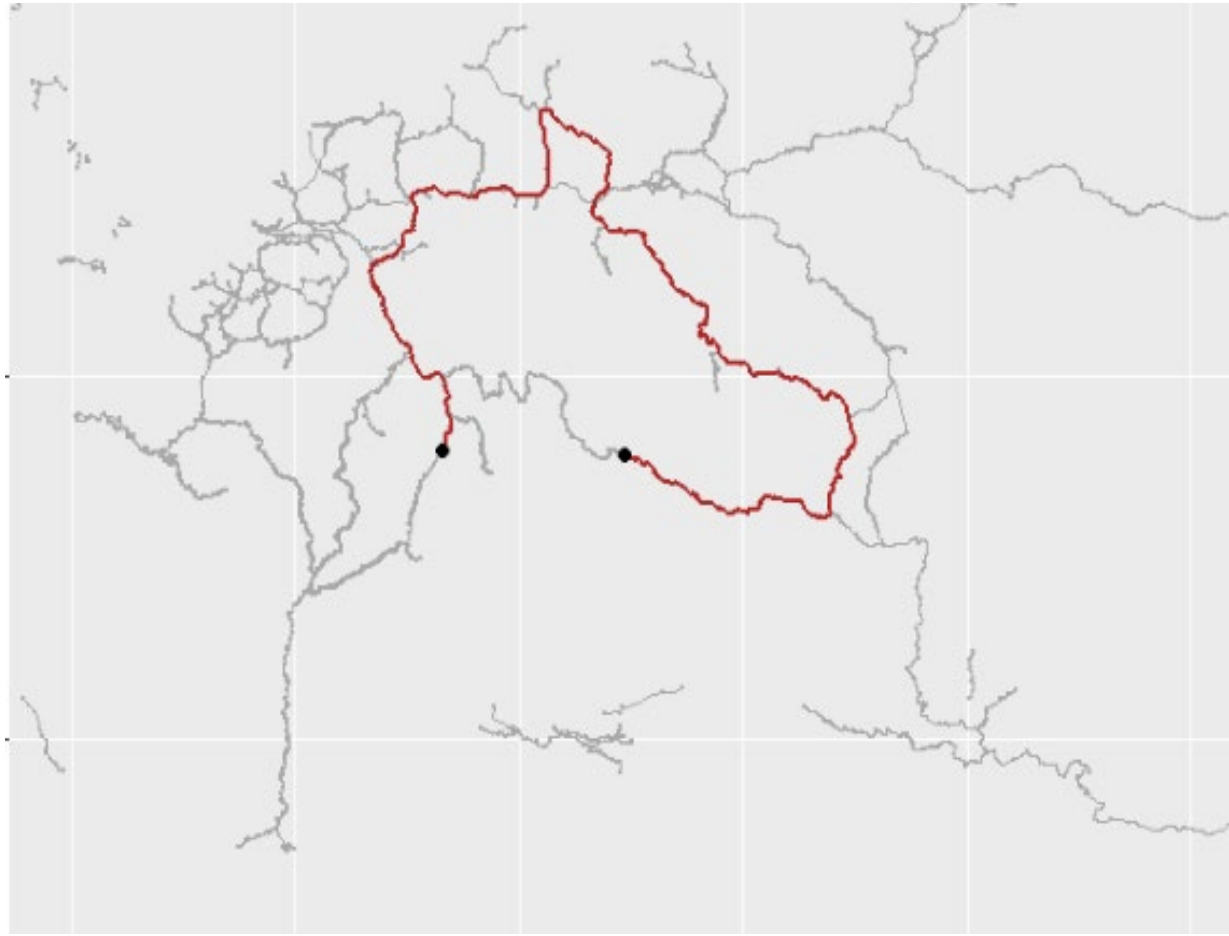
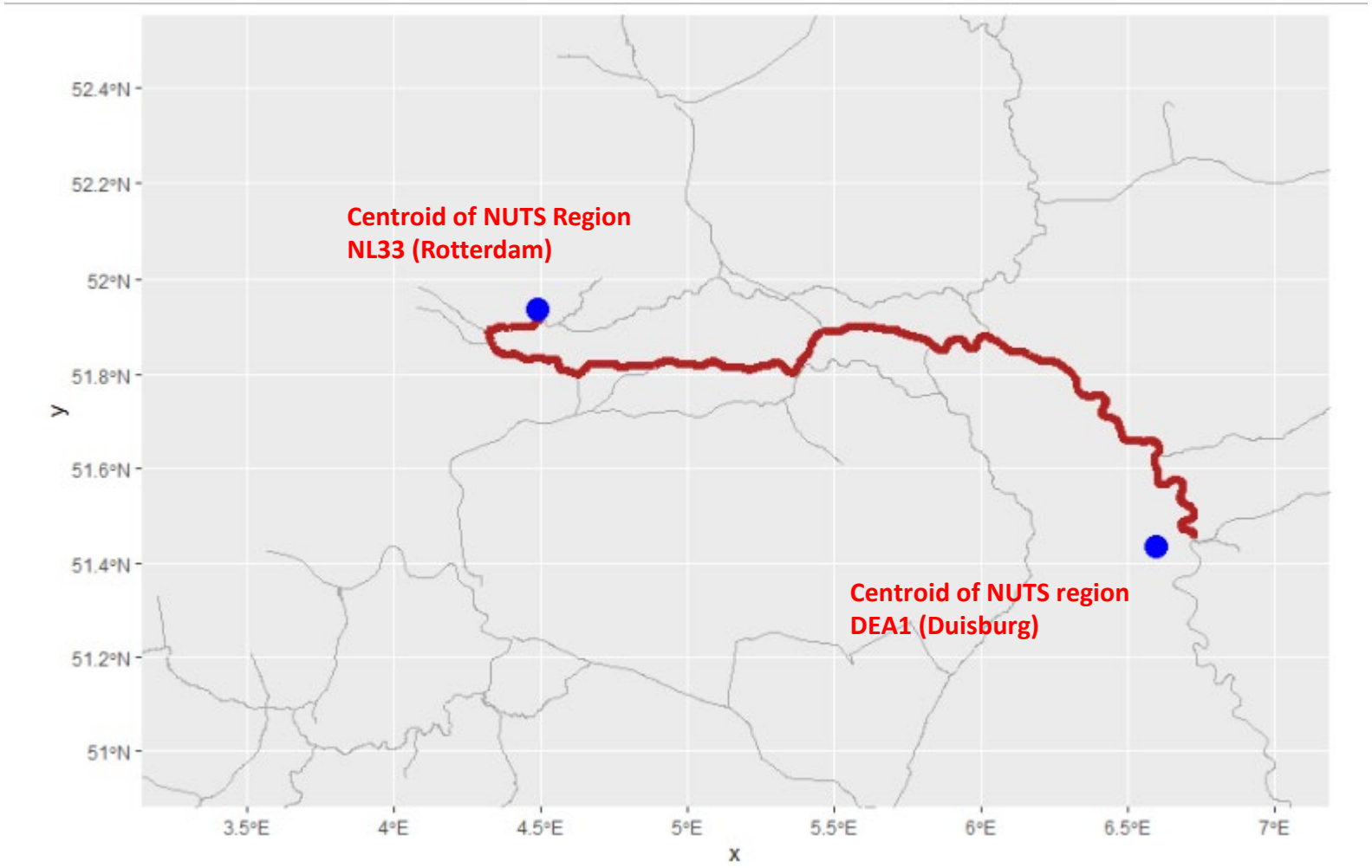




- Finally, apply the NUTS2 centroids to the network (as the crow flies).
- Next step: sum multiple origin-destination pairs for each network segment.
- Colour each segment based on most common good transported?
- Highlight segments growing most over time?



# Summary

- Using available statistical data, a large amount of geospatial visualisations can be achieved for IWW analysis and producing detailed Inland Waterway maps of goods transport.
- Non-Eurostat countries: if similar regional data are available, similar analyses can be conducted.
- The analysis is conducted in R (open source) using public datasets. The code or output is available on request.
- Proof of concept a success. Further analyses are possible, depending on analytical need. Examples: types of good, type of cargo, type of vessel, changes over time, comparisons with other modes, combinations with industrial economic data etc. **What does SC3 want to see?**