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TRANSPORT STATISTICS



UNECE

# E-Road and E-Rail Censuses: Update, Future Plans and Traffic Visualisation

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# Overview



- E-Road 2020 Status and delays
- E-Rail 2020 Status
- Utility of censuses and future plans
- What about Inland Waterways?

# 2020 E-Road Census: Background



- E-Road Census collects infrastructure information + traffic volumes (AADT) on the E-Road network (as defined in the UNECE AGR agreement) every 5 years.
- Traffic breakdown (heavy vehicles versus light vehicles) useful as proxy for goods/people
- Data used for infrastructure planning, identification of bottlenecks, road safety benchmarking, regional modal split.

# 2020 E-Road Census: Received



- Received contributions from 12 countries. Armenia, Belarus, Bulgaria, Croatia, **Czechia**, **Finland**, Hungary, Kazakhstan, Netherlands, Russian Federation, Serbia, **Sweden** (bold gave Shapefiles)
- Delayed contributions: 6 countries (Austria, Germany, Poland, Romania, Slovakia, Switzerland)

# Dissemination



<https://unece.org/transport/transport-statistics/traffic-census-2020>

Country	Questionnaire	Map	Shapefiles	Notes
Armenia	<a href="#">XLS</a>			Some vehicle-km data for 2015, 2019 and 2020.
Belarus	<a href="#">XLS</a>			No traffic volumes recorded in 2020.
Bulgaria	<a href="#">XLS</a>			<a href="#">Additional data</a> on AADT at all counting posts.
Croatia	<a href="#">XLS</a>	<a href="#">Croatia</a>		Traffic volumes for 172 posts, 2020 and 2015.
Czechia	<a href="#">XLS</a>		<a href="#">ZIP</a>	<a href="#">DOC</a>
Finland	<a href="#">XLS</a>		<a href="#">ZIP</a>	Traffic volumes for 2019 and 2020.
Hungary	<a href="#">XLS</a>	<a href="#">Hungary</a>		Total traffic volumes (split by type of traffic).
Kazakhstan	<a href="#">XLS</a> (EN translation)			<a href="#">Russian original</a>
Netherlands	<a href="#">XLS</a>			Traffic volumes for 2169 posts for 2020
Russian Federation	<a href="#">XLS</a>			Traffic volumes for each E-Road for 2020 and 2015, (split by type of traffic).
Serbia	<a href="#">XLS</a>			
Sweden	<a href="#">XLS</a>		<a href="#">ZIP</a>	

# Dissemination (Croatia example)



E-Road number <sup>1</sup>	Counting post number		Length of road section	Number of carriageways	Normal width of road section of each carriageway	Number of lanes <sup>2</sup>	Normal or average width of lanes between counting posts	Width of central reserves <sup>3</sup>	Width of emergency stopping strips <sup>3</sup>	Average design speeds <sup>4</sup>	Annual average daily motor traffic flow in 2020	% change in comparison with 2015 <sup>5</sup>
(A)	(B)		(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
59	1114		7.5	2	7.50	2+2	3.75	4	2.5	120	5 501	-36.54
59	1113		10.3	2	7.50	2+2	3.75	4	2.5	120	6 018	-35.53
59	1116		4.8	2	7.50	2+2	3.75	4	2.5	120	8 997	-25.33
59	1115		12.8	2	7.50	2+2	3.75	4	2.5	120	9 941	-25.36
59	1904		16.5	2	7.50	2+2	3.75	4	2.5	120	12 649	-15.14

# Dissemination



- <https://unece.org/transport/transport-statistics/traffic-census-2020>



# 2020 (or 2021) submissions



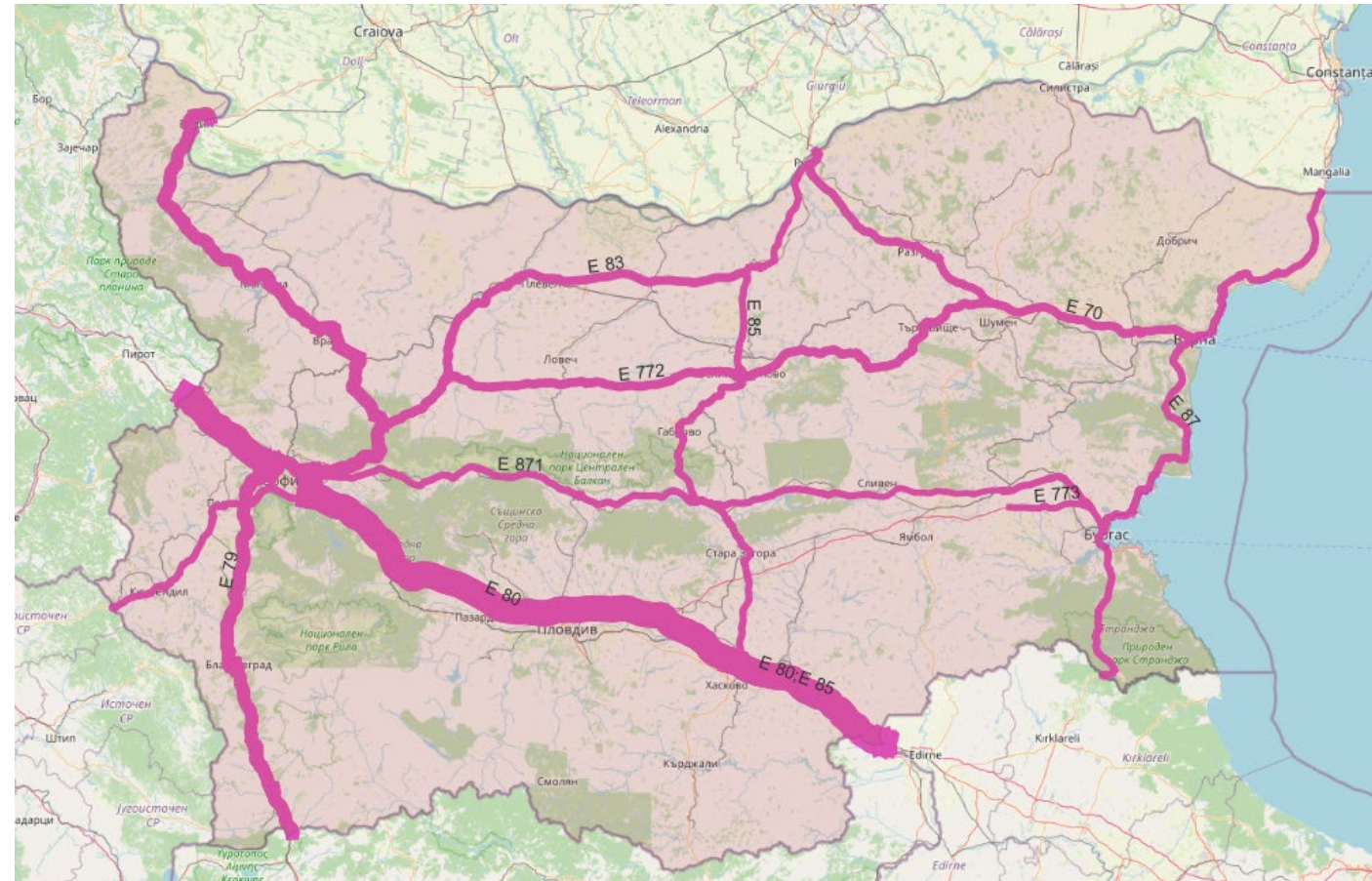
- Please provide by 10 September if possible, even if incomplete.



# Mapping with Limited Information



- Even a single AADT figure for an entire E-Road in a country can have value.
- But **coordinates** of counting posts allow this to be done at a much greater degree of detail.



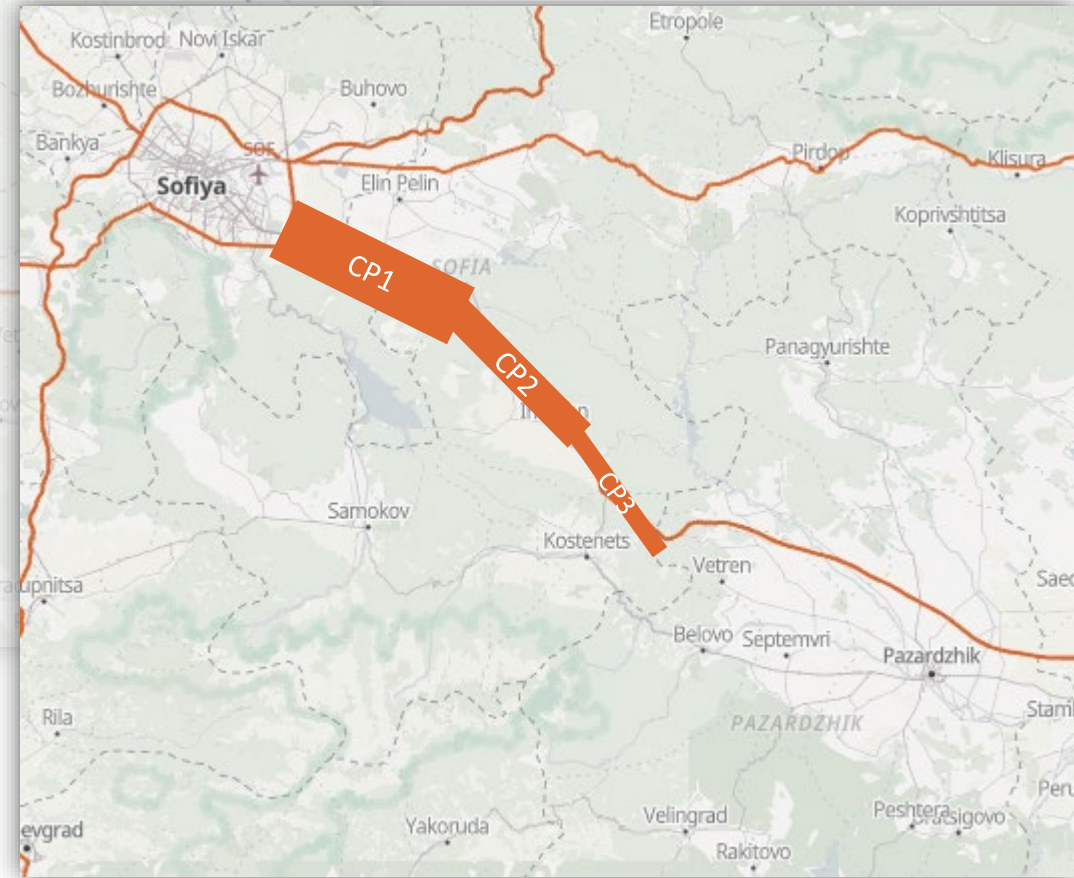
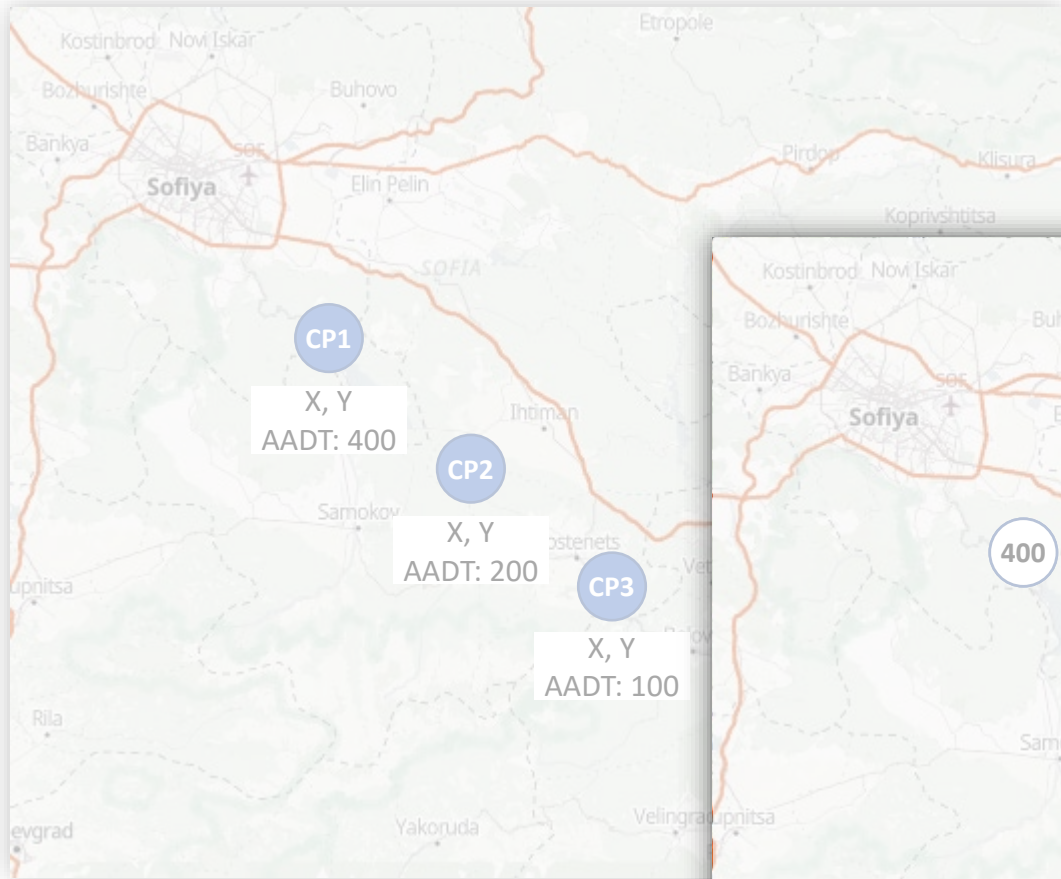
Baselayer: © OpenStreetMap contributors

# Road Census Future Plans



- Some of the excel tables have limited value/are very detailed.
- Main value added of the road census is geospatial analysis of traffic patterns.
- Would a simplified questionnaire asking mainly for traffic counts (with coordinates) be easier for NSOs and/or Highway agencies to complete?

# No Shapefiles? No problem!





# E-Rail Census



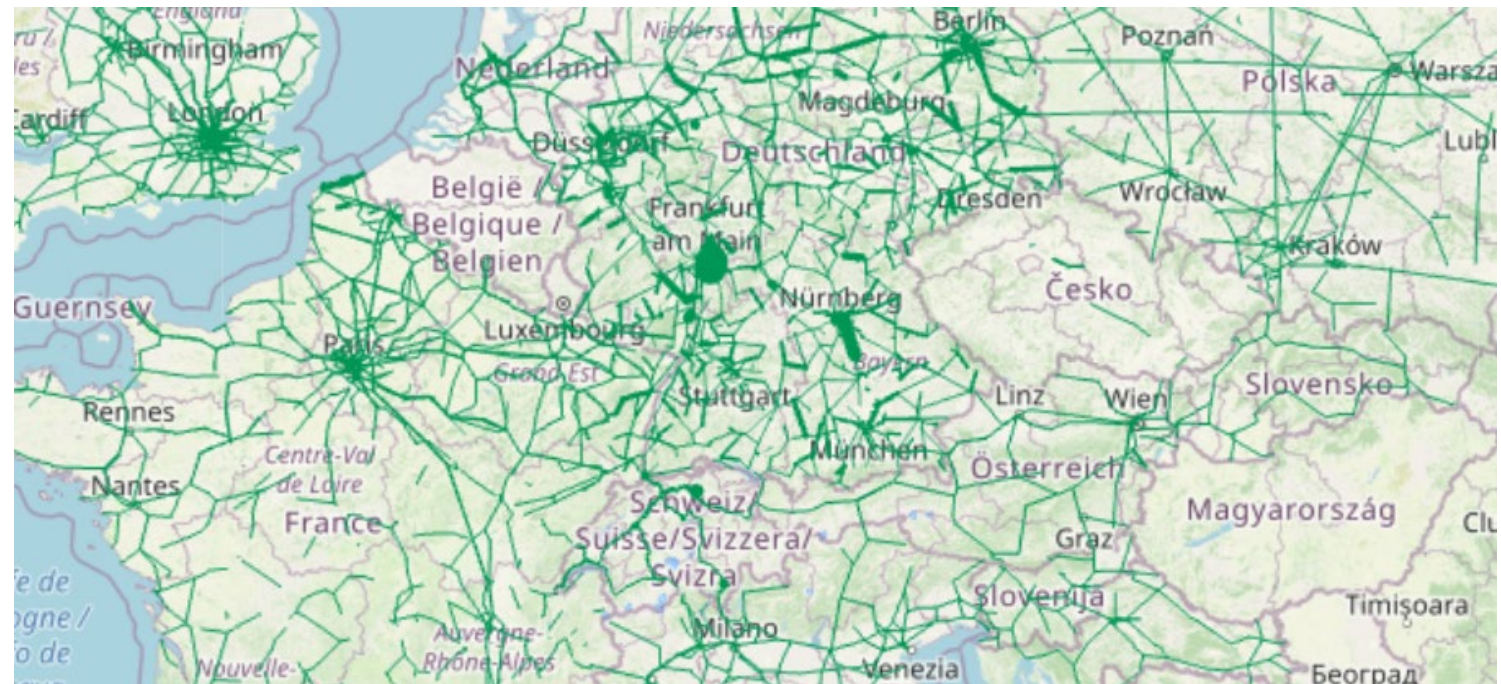
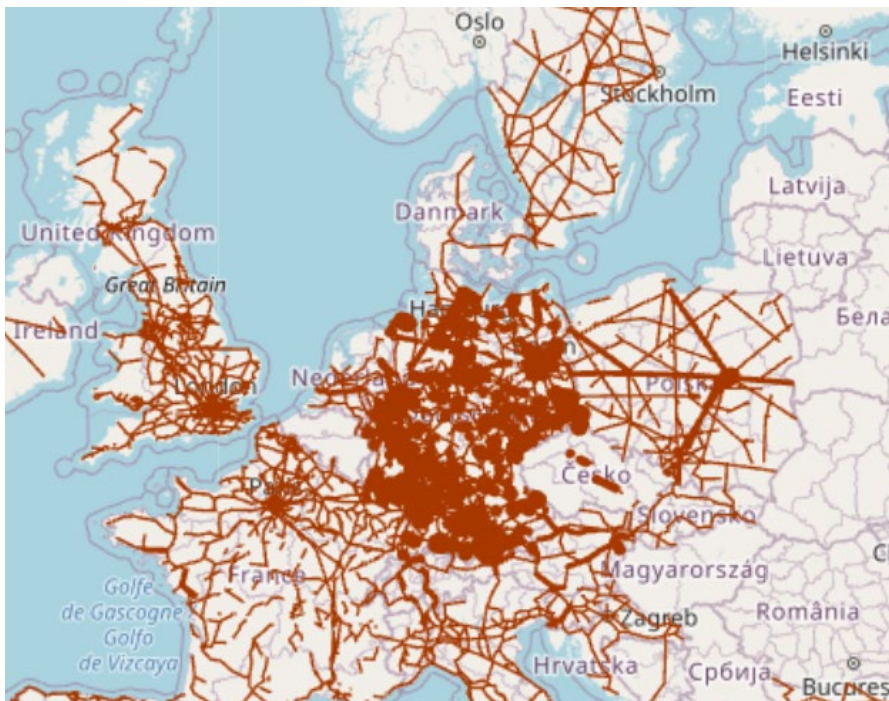
- Reminder: collects traffic information (trains per year, broken down by passenger and goods).
- Split the network into network segment identifiers.
- Some infrastructure information (type of current etc) asked for too.
- **Eurostat countries: this is Annex V/Annex G**

# E-Rail Census

<https://unece.org/traffic-census-2015>



- For non-Eurostat countries, please provide your results **by 30 June 2022**
- UNECE maps these results automatically as straight lines
- Future: use the AGR to project the straight lines into the real network?



# Visualising Inland water traffic



- WP.6 decided in 2019 to explore an E-IWW census-like exercise, but trying to use **existing** data sources.
- As no international IWW **traffic** data are available, let's try to use origin-destination transport measurement instead.
- Eurostat *iww\_go\_atygofl* table main source

# Process



- Import Eurostat NUTS2 origin-destination data
- Import the NUTS2 Geospatial objects separately and calculate their centroids
- Merge the activity data and the centroid coordinates
- Draw lines between each origin and destination (thickness based on tonnage)
- Plot the results in Leaflet (a mapping package)





Less useful



Flows > 220kt. Somewhat useful (but hard to quantify so many lines on the Rhine.)



Good, but...



Can we map this on the real network?

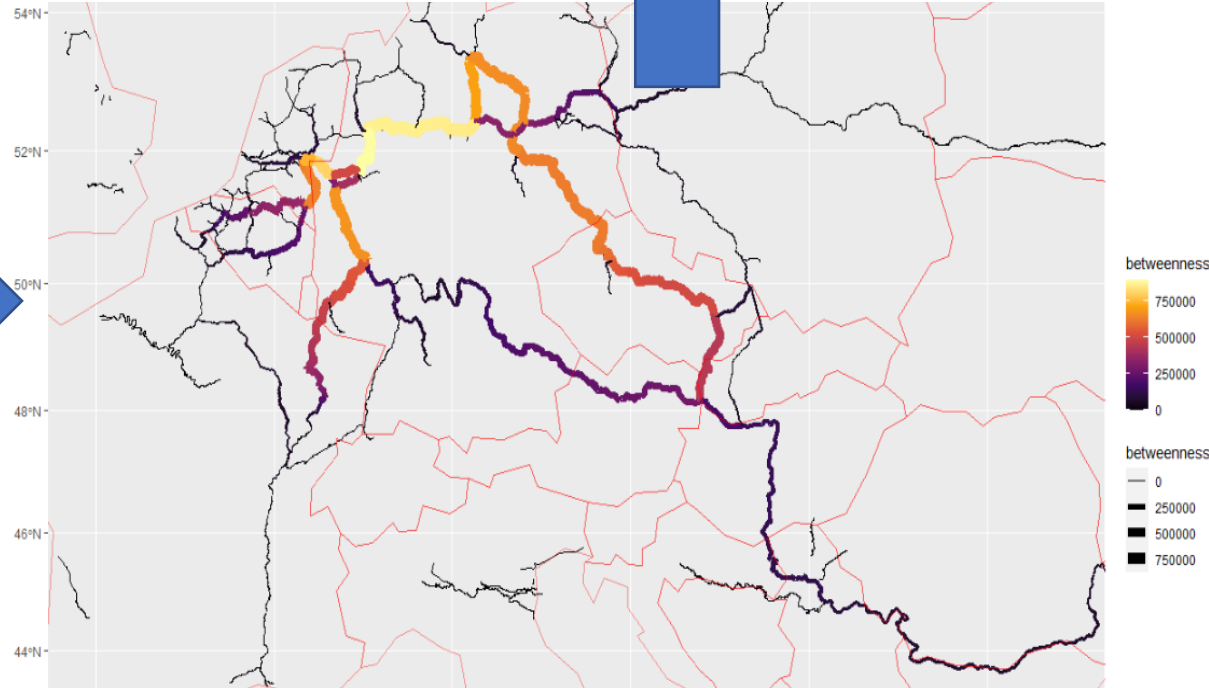
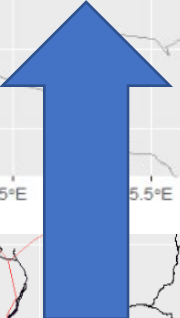
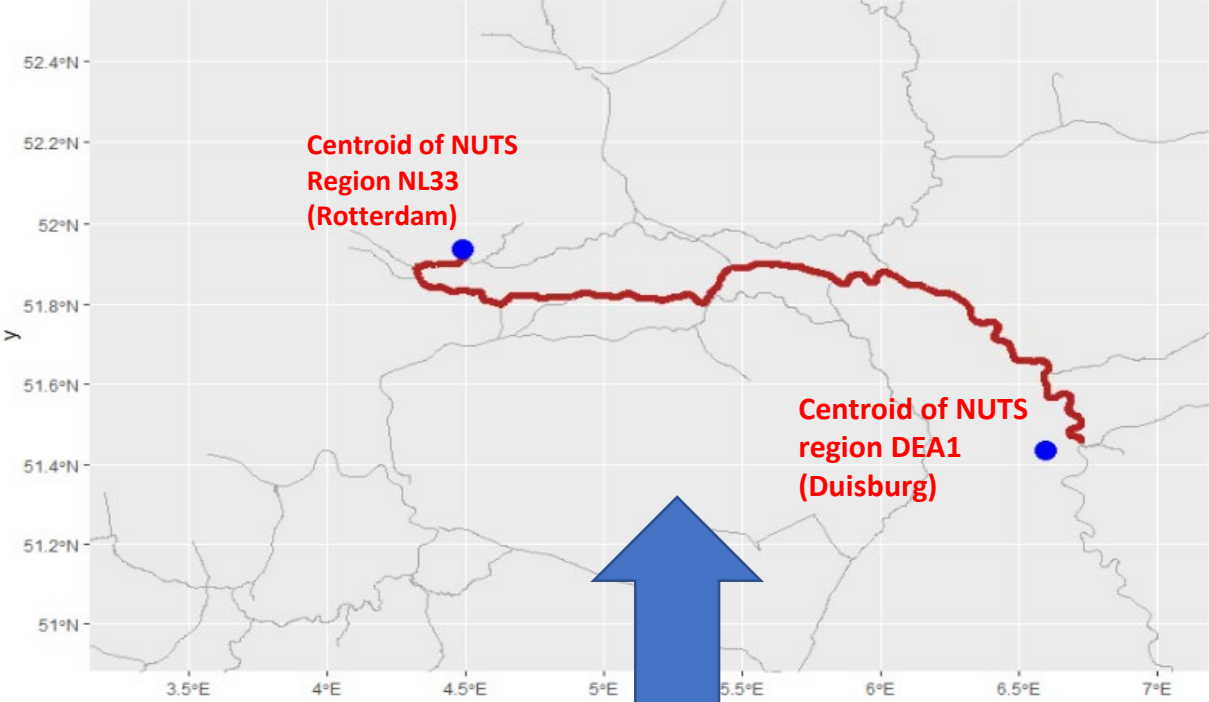
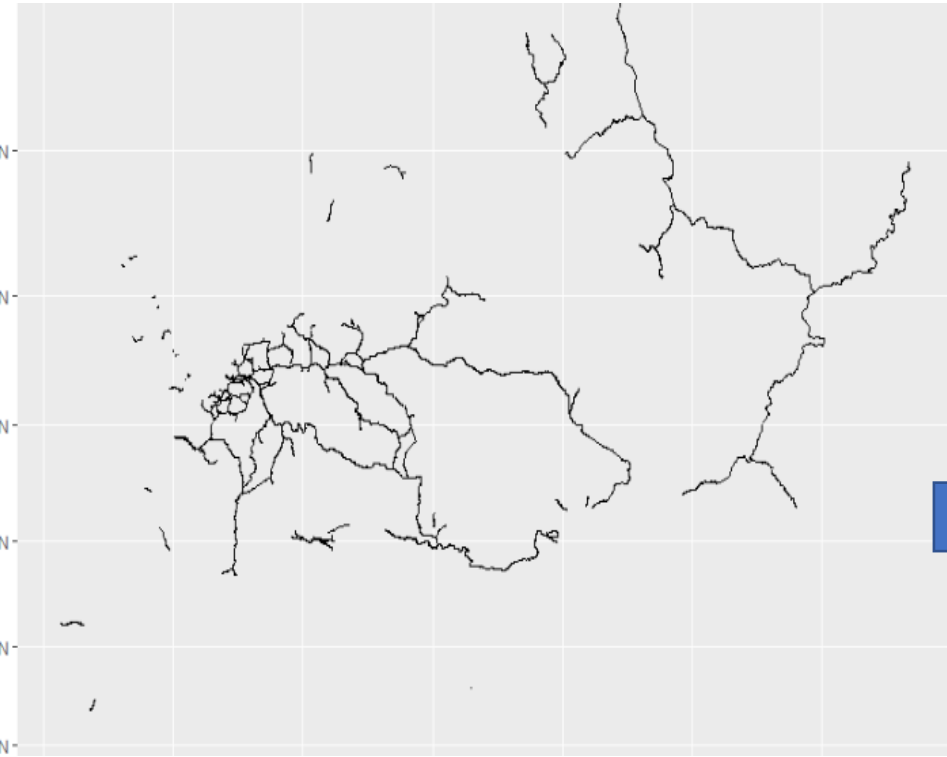
# Process



- Import a Shapefile of the “real” network (available from UNECE Infrastructure agreement AGN, “Blue book” database)
- Translate each origin and destination onto the closest node of the network (making 2300+ different paths)
- Chop these paths up into their individual edges between nodes
- Sum up each edge based on total tonnage passing through it
- Combine all the edges up into a single object and Plot

A shapefile is not a network.  
A network has nodes and edges

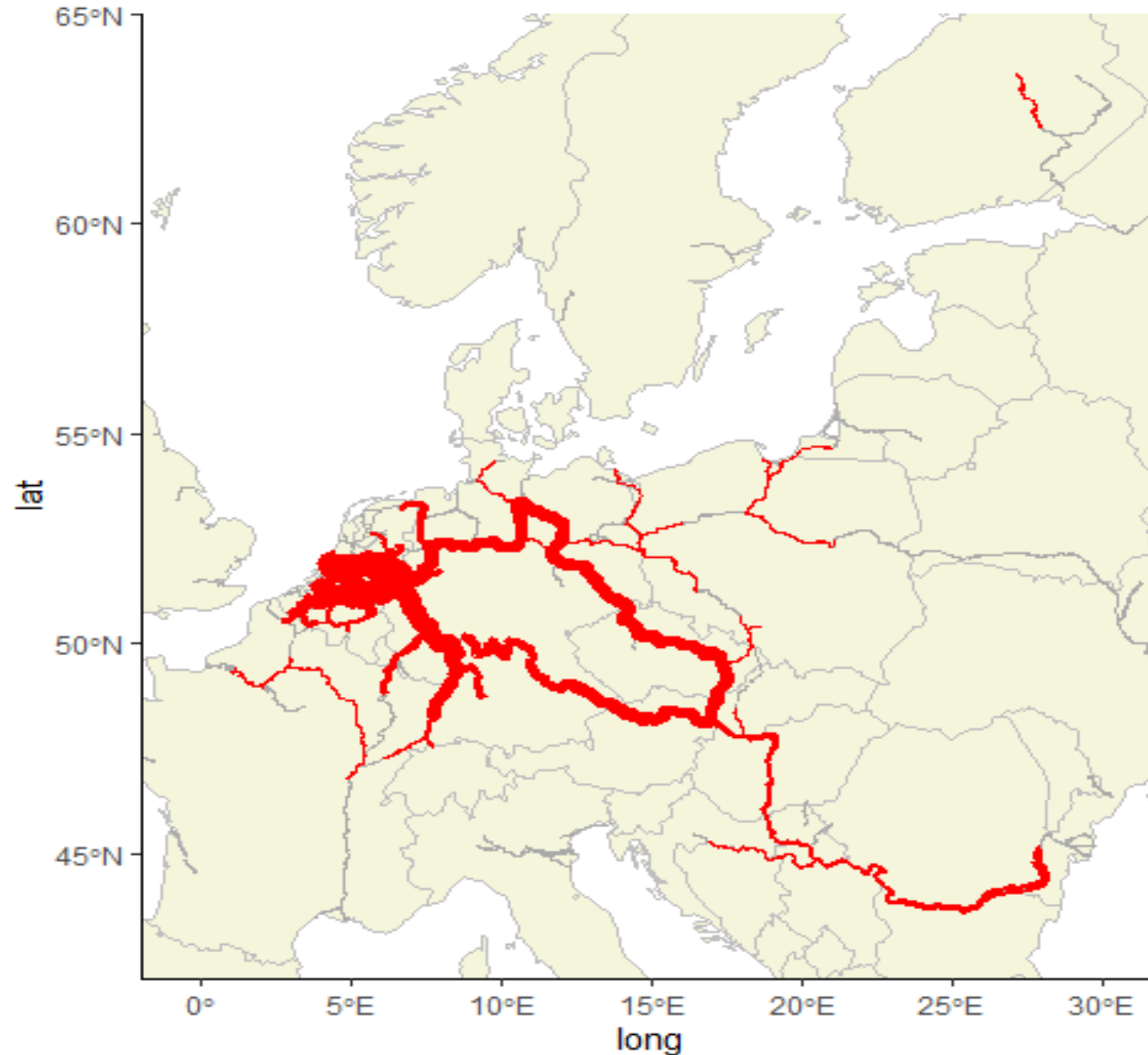
<https://r-spatial.org/r/2019/09/26/spatial-networks.html>



## Remaining issues

- Make the map interactive
- Holes in Shapefiles
- Manually move coastal centroids to the sea?
- Dealing with Region X > Region X flows (solution: geospatial jittering?)
- No account of canal width/navigability
- No sea connections
- Any similar data for non-Eurostat countries?

**To be published soon**



# Uses in UNECE



- Quantifying value of transport infrastructure (AGC, AGN, AGR)
- Highlighting where certain products (Energy? Food?) moved
- Modal split on specific corridors and identifying shift opportunities: where can goods be taken off the road?
- Apply the same method to Rail Census, other sources (road?)

# Census Summary



- E-Road census:
  - Please provide any traffic data (2020/2021) by September if possible.
  - If no Shapefiles, can you provide coordinates of counting posts?
  - How should the census evolve for 2025?
- E-Rail census:
  - Non-Eurostat countries: data by end of June
  - The secretariat will try to improve results visualisation
- Further visualization ideas (IWW and other sources) to be explored