

GRID MATCHING TOOL

Enabling the interaction between georeferenced grid models

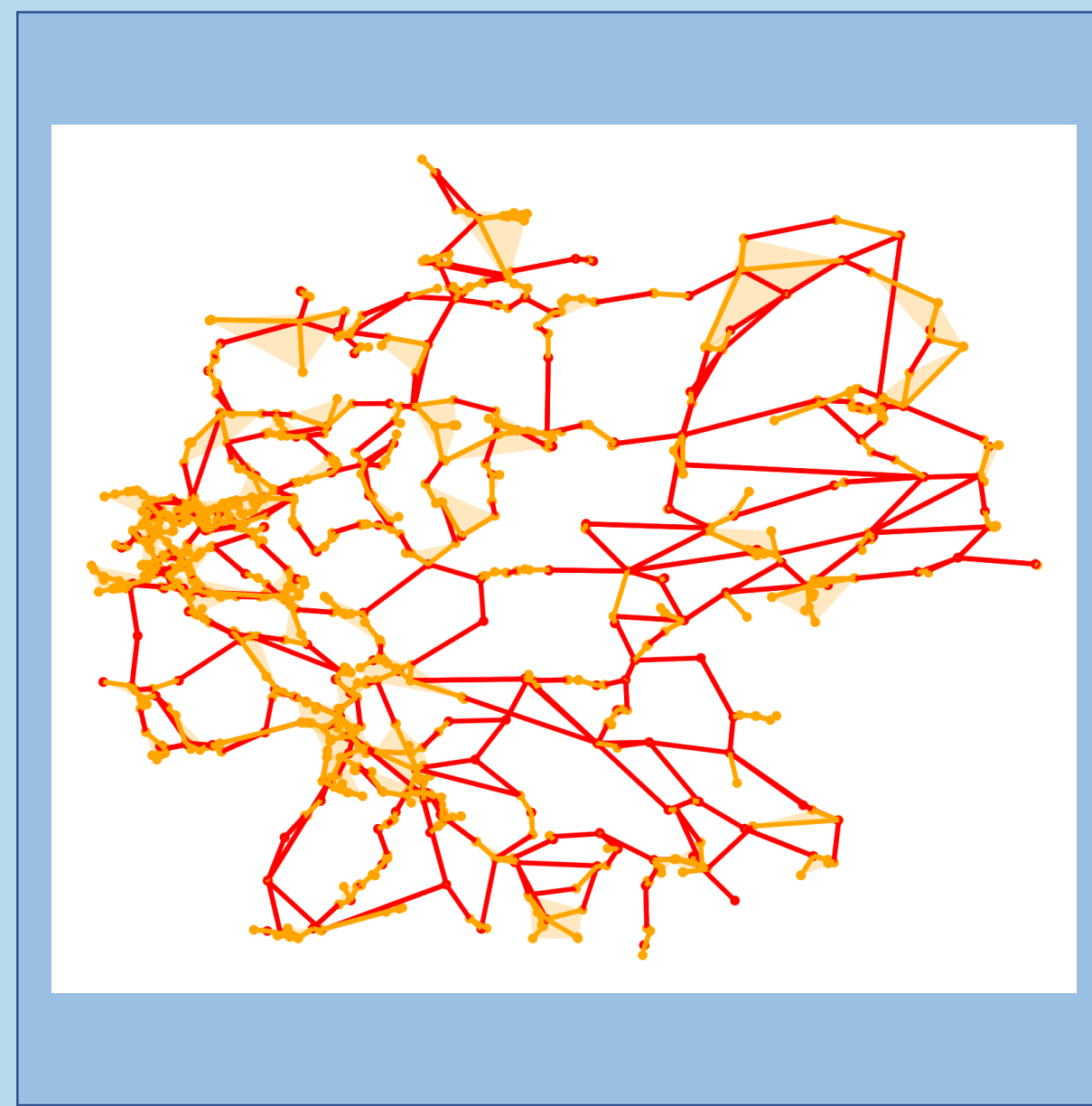
Oriol Raventós¹, Abhilash Bandam², Theresa Groß², and Ontje Lünsdorf¹

<https://gitlab.com/dlr-ve-esy>

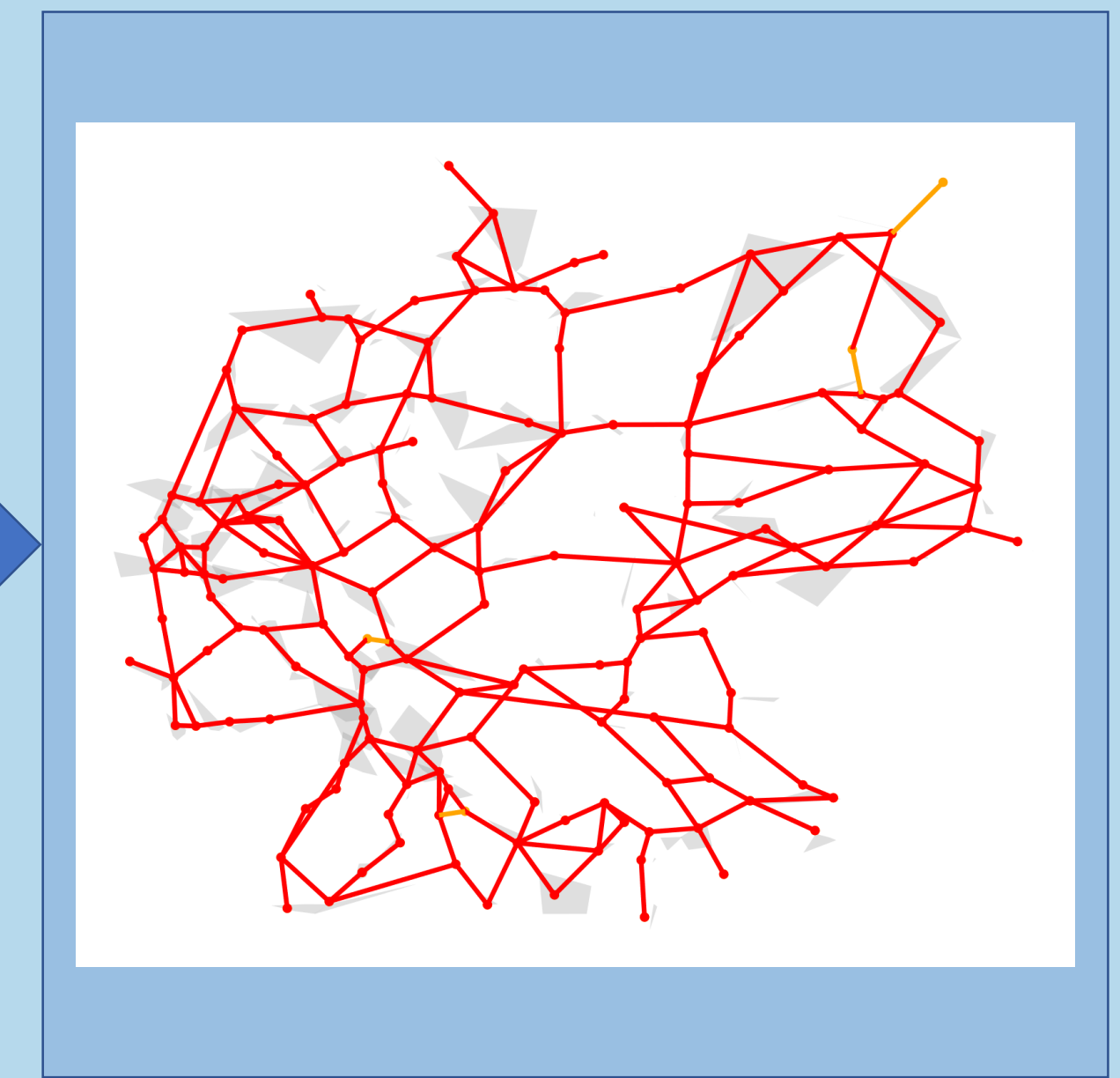
Grid Matching: Identification of clusters of nodes between two grid models

Method to match grids A and B:

- Let $f: A \rightarrow B$ assign to each node in A the closest node in B (using the Euclidean distance) and $g: B \rightarrow A$ vice versa.
- Nodes $a = g(f(a))$ in A are in one-to-one correspondence with nodes $b = f(g(b))$ in B. They are the **centers** of the clusters.
- The rest of the nodes are assigned to a center using the shortest path in each grid.

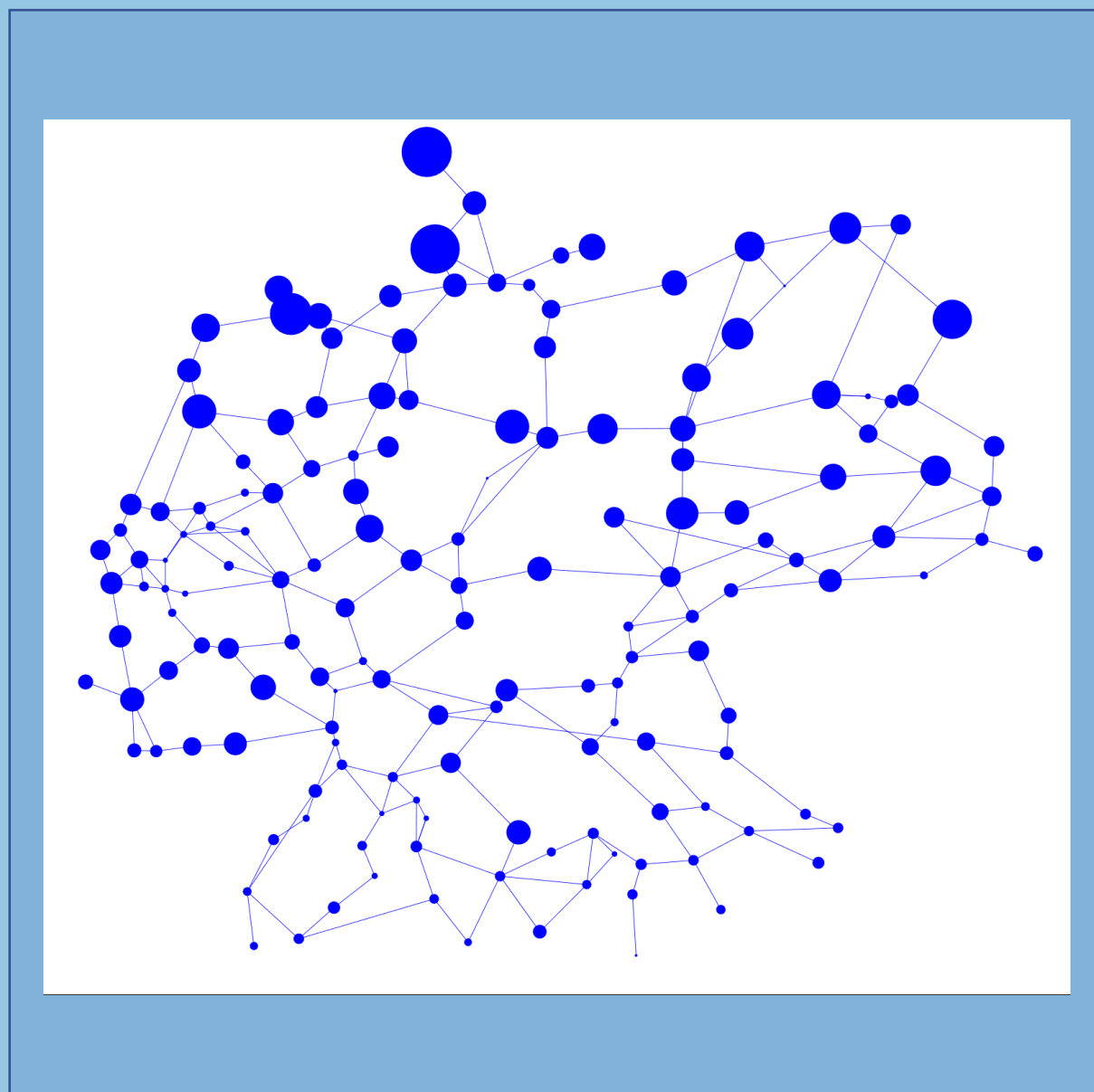


Clusters in eTraGo German power grid.

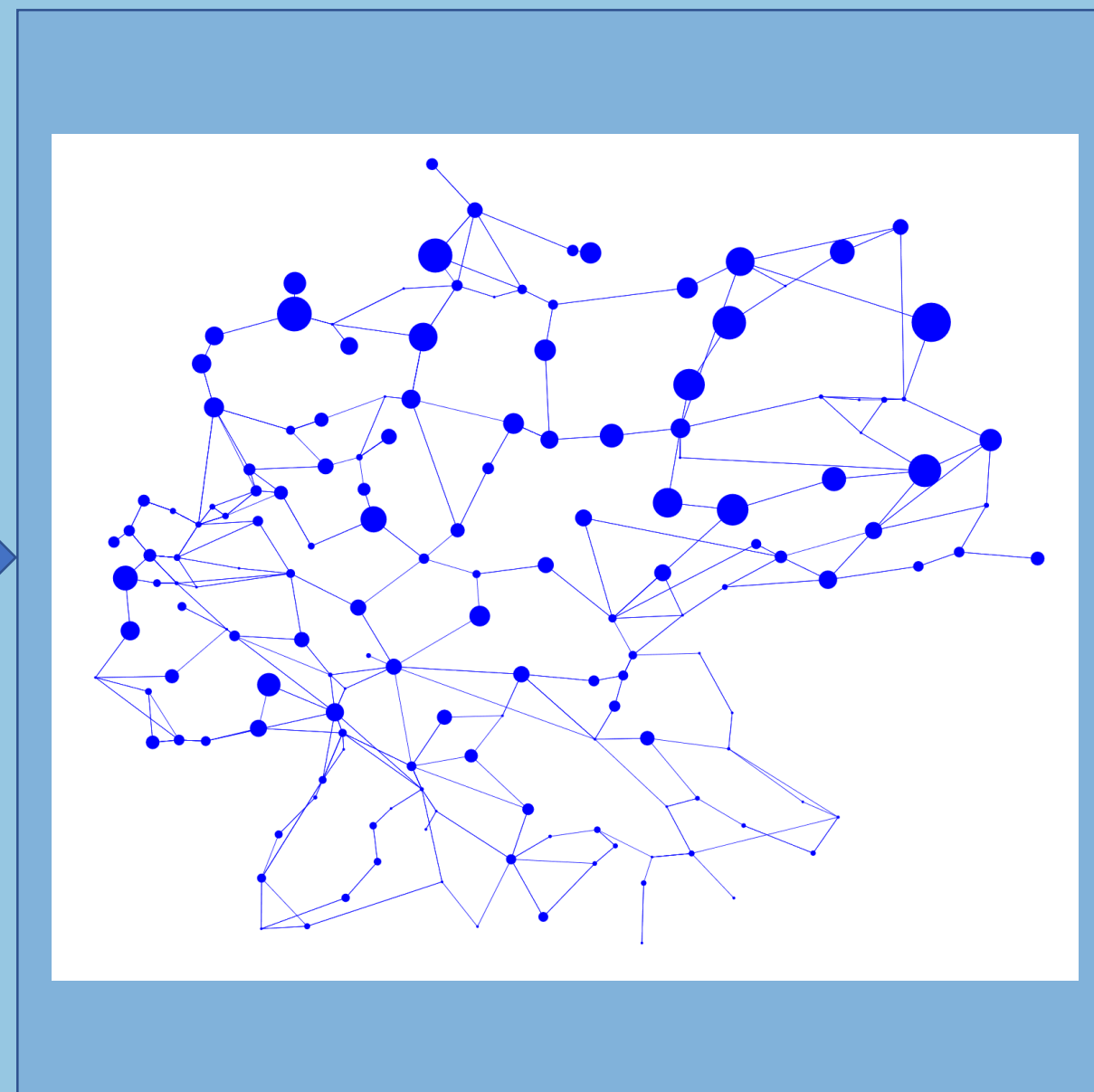


Clusters in PyPSA-EUR German power grid.

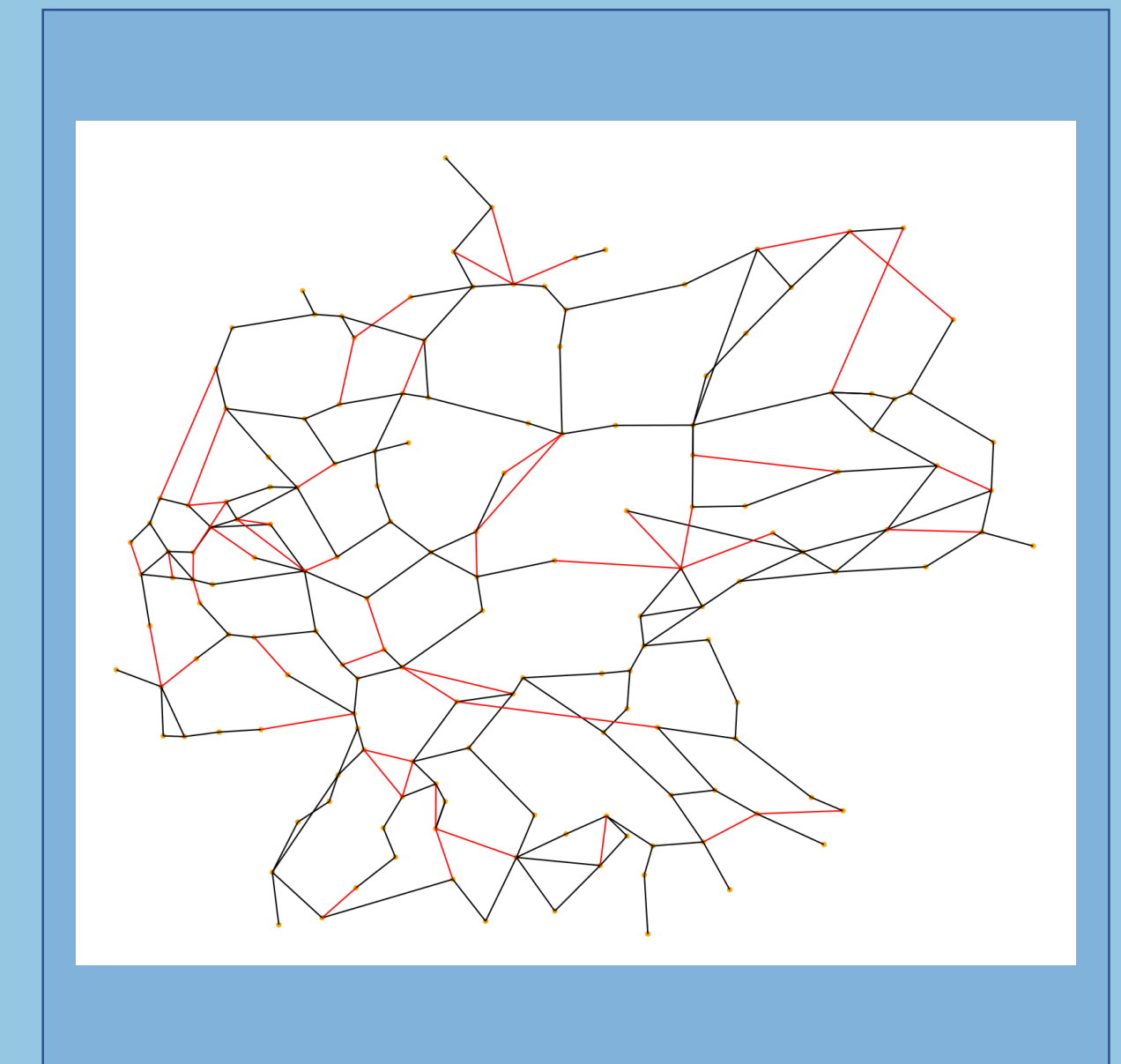
Comparison of data between different grid models



PyPSA-EUR wind onshore installed capacity in Germany.

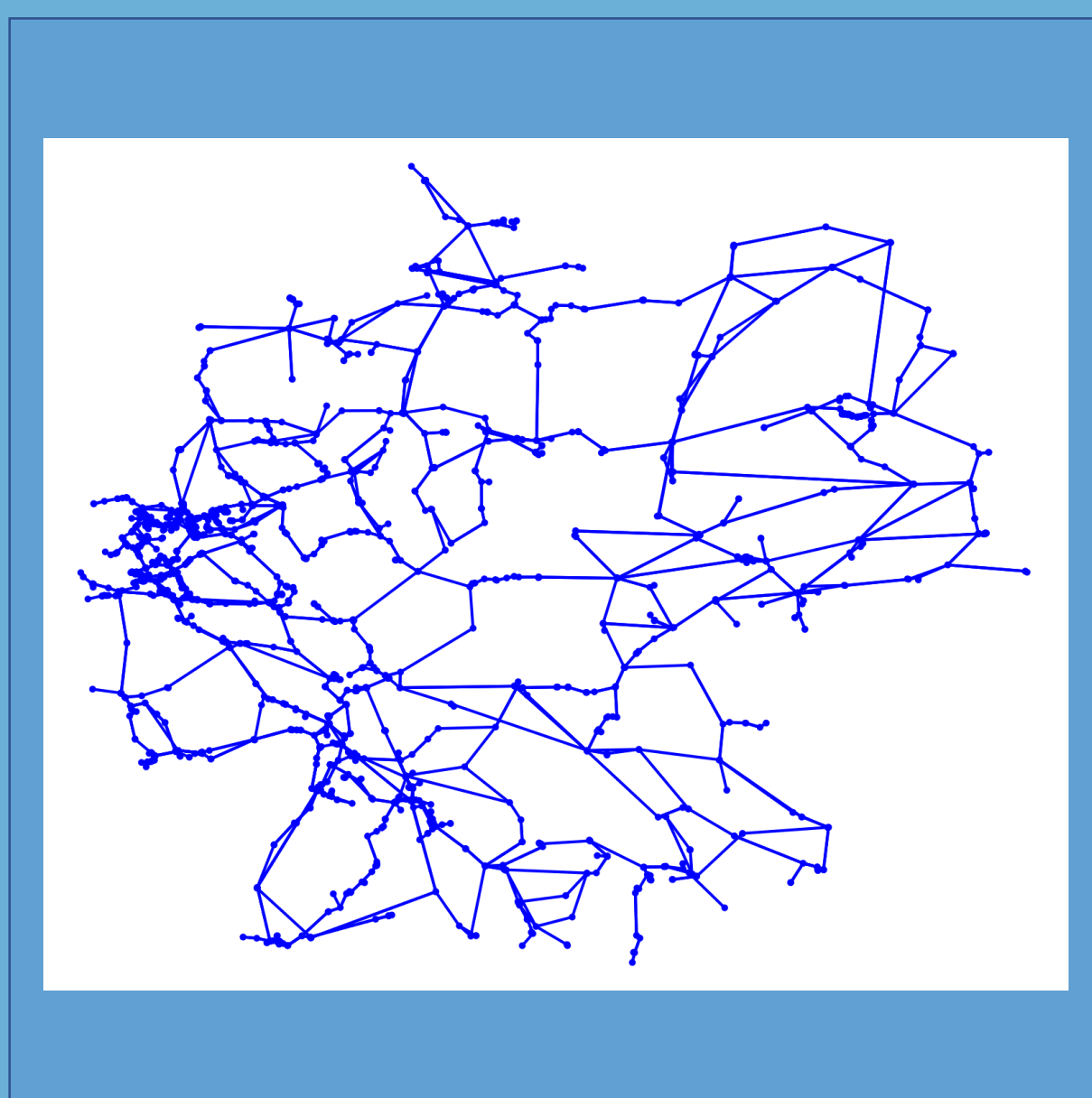


eTraGo wind onshore installed capacity in Germany.

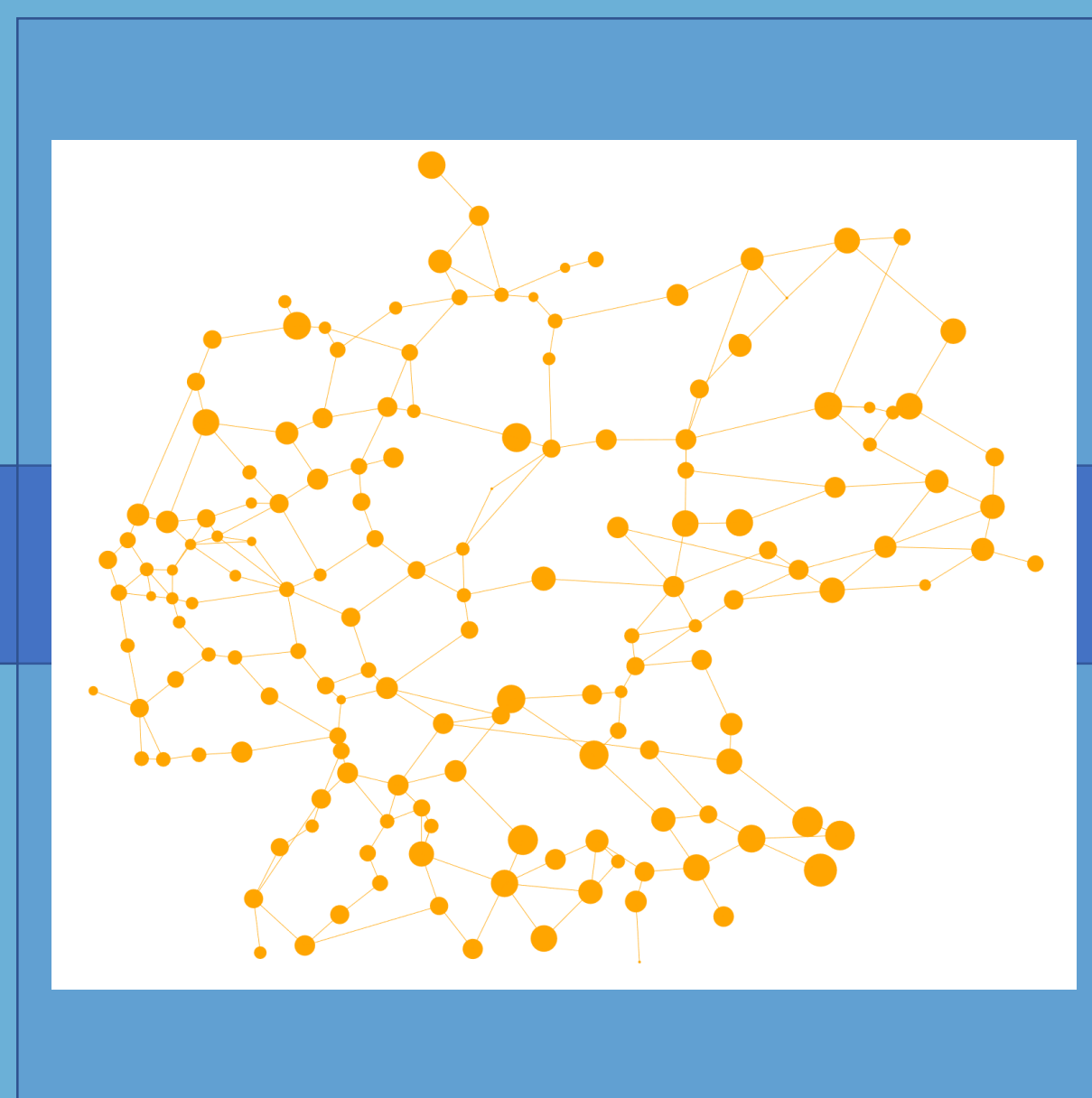


PyPSA-EUR grid topology. In red the lines missing in eTraGo.

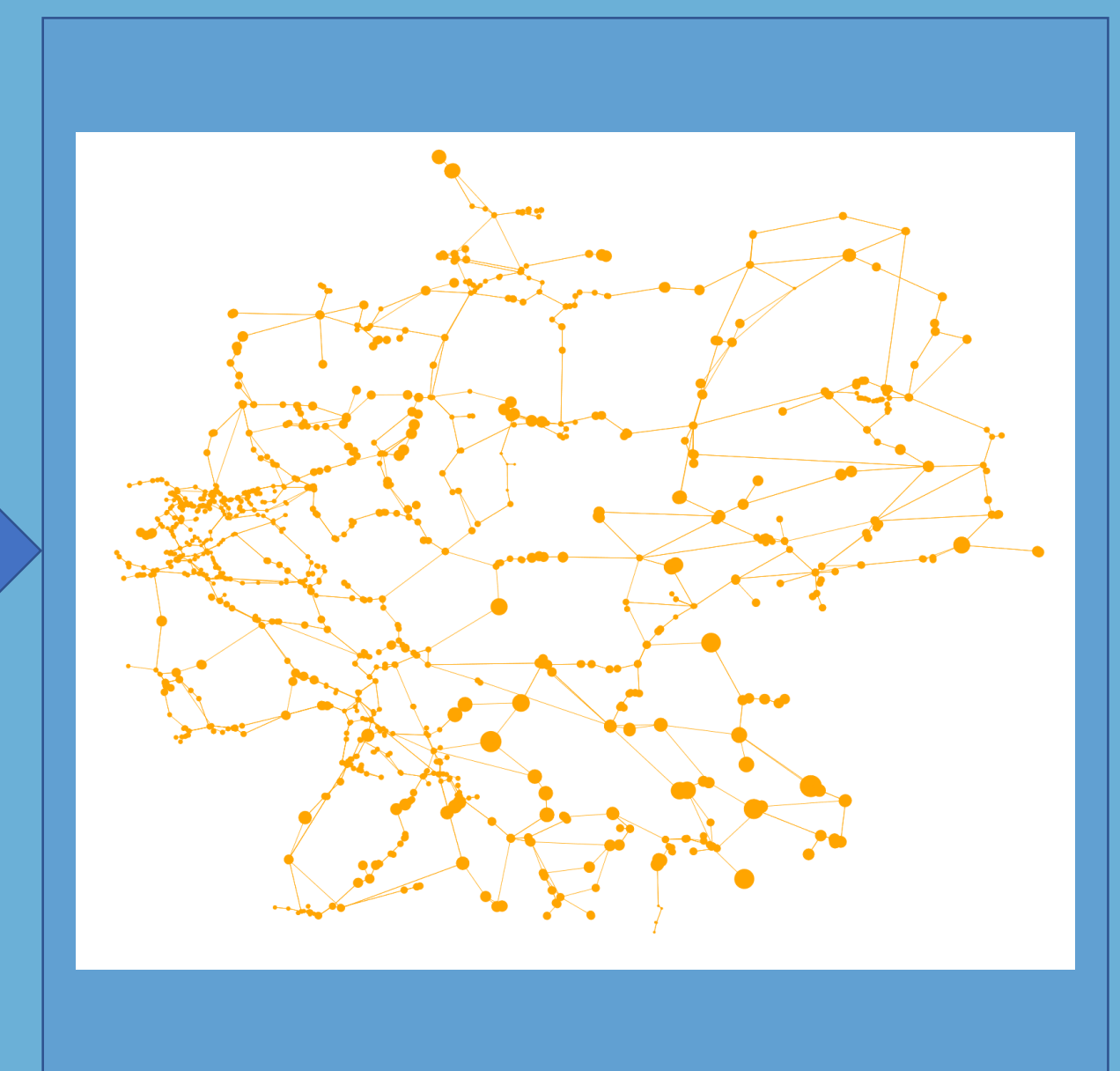
Transfer of data between grid models



eTraGo grid in Germany.

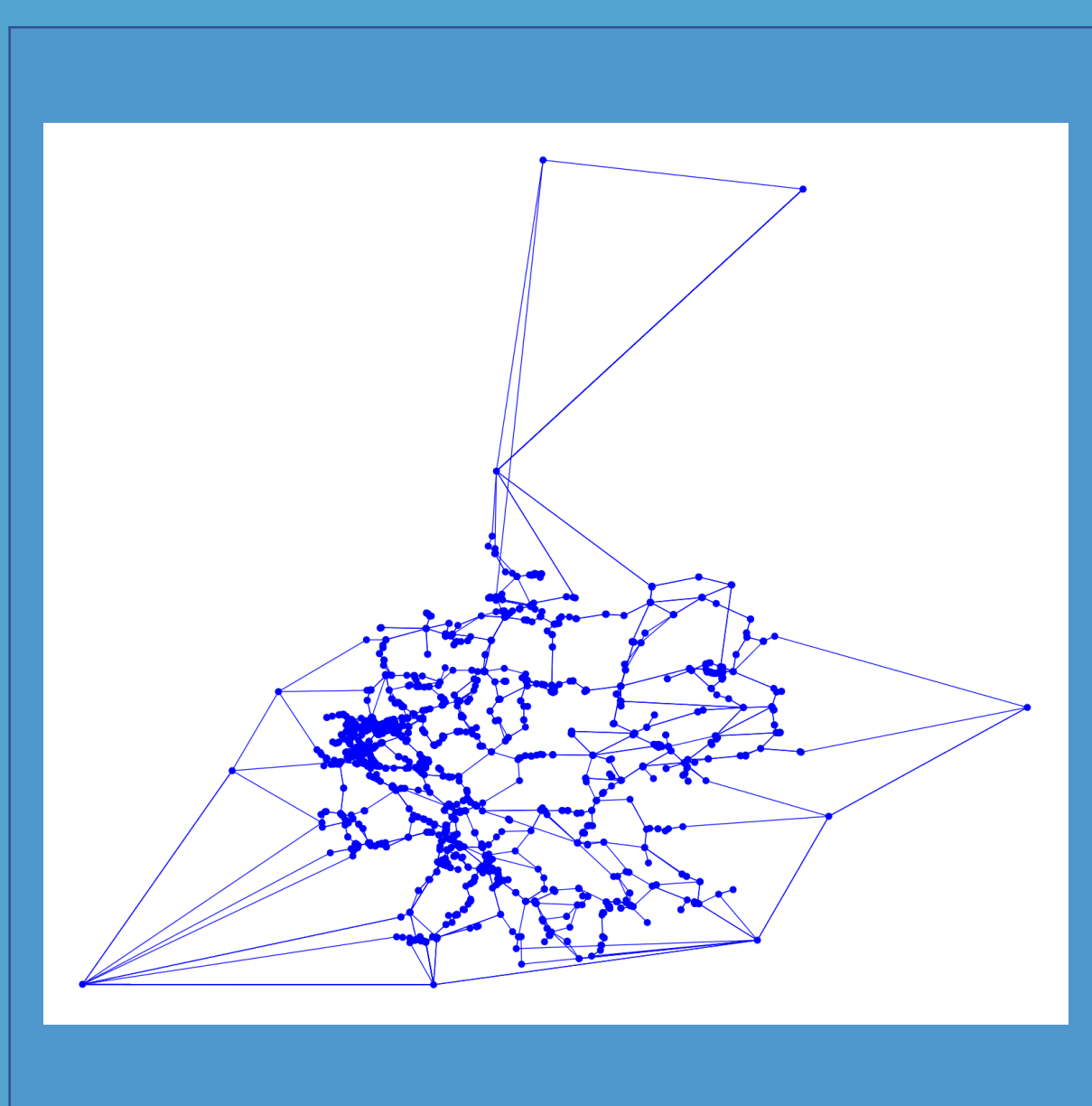


PyPSA-EUR PV installed capacity in Germany.



PV installed capacity from PyPSA-EUR transferred to eTraGo.

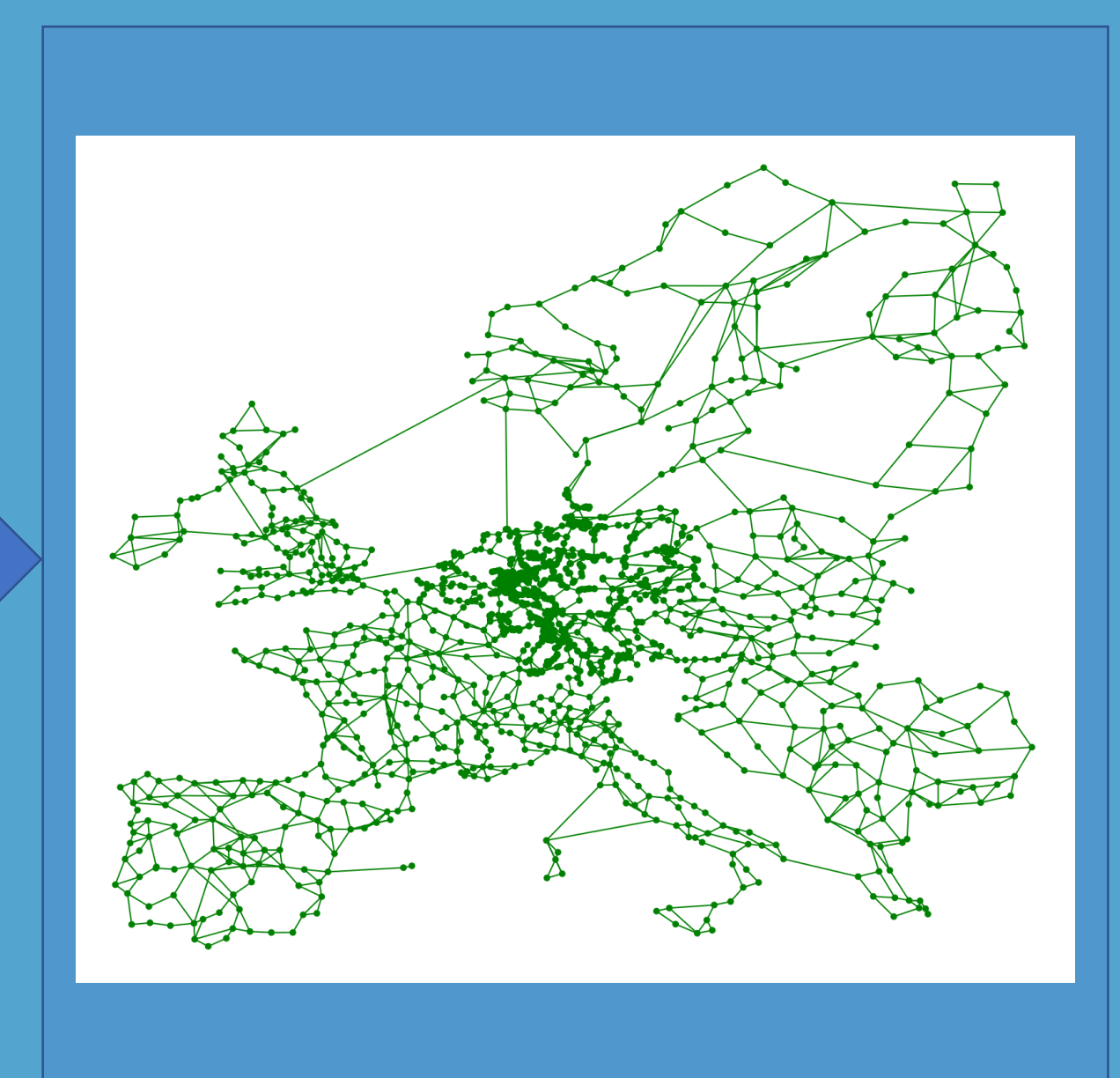
Join two grid models using the clusters with higher resolution parts from each one



eTraGo grid.



PyPSA-EUR grid.



Joined eTraGo and PyPSA-EUR grid.

¹ German Aerospace Center (DLR), Institute of Networked Energy Systems, Carl-von-Ossietzky-Str. 15, 26129 Oldenburg, Germany

² Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research – Techno-economic Systems Analysis (IEK-3), 52425 Jülich, Germany

[PyPSA-EUR] <https://zenodo.org/record/7646728>

[eTraGo] <https://github.com/openego/eTraGo/tree/0.8.0>