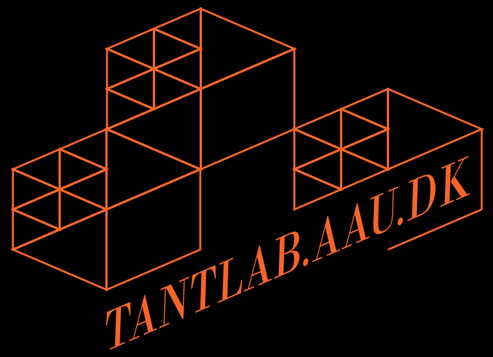
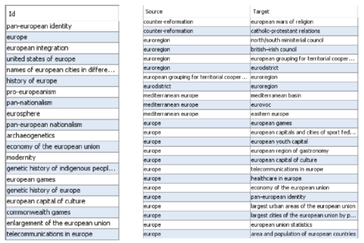
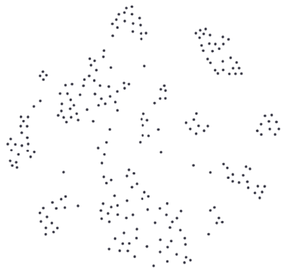


Visual Network Analysis

A guided approach to the mediation

Mathieu Jacomy
Aalborg University TANT-Lab

Layers of mediation

STEP	BEINGS REPRESENTED BY THE DATA (empirical phenomena)	DATA SOURCE (any kind of data)	NETWORK DATA (nodes & edges)	LAYOUT/EMBEDDING (node coordinates)	NETWORK MAP (picture)
Examples					
	Person, website, book, friendship, influence...	*Database of documents, list of tagged items, XML file(s)...*	*List of nodes + list of edges (with attributes)*	*(X, Y) coordinates for all nodes*	*An image on a physical substrate (screen, paper...)*
MEDIATION	Reduction to formal inscriptions	Processing	Network extraction (reduction)	Processing	Compute layout (embedding)	Image rendering (semiotic building)	Image reading

Different concepts apply to different layers

PICTURE
- Position / distances / groups
- Size
- Color

GRAPH / NETWORK
- Nodes and edges
- Connected
- Paths, geodesic distance
- Structural equivalence / embeddedness
- Graph metrics (ex: centralities)
- Attributes from algorithms (ex: clustering)
- Attributes from the data

DATA
- Entity (ex: keyword, Twitter user)
- Relation (what does it represent?)
- Attributes

PHENOMENON
- Empirical beings: people, political parties, animals, proteins, companies, documents...
- Conceptual framing
- Research questions

The mediation from one layer to another is never self-evident.

A guided process for visual network analysis

Step 1
Apply a layout to your network.

Step 2
Identify the main clusters.
Circle them and name them temporarily.

Step 3
Identify main structural holes.

Step 4
Identify sub-clusters and minor clusters.

Step 5
Display a node attribute and compare its distribution to the clusters, sub-clusters, and structural holes already identified.
This generates insights (interpretations).

Step 6
Look for nodes in special situations:
Central/peripheral, bridge, outlier...

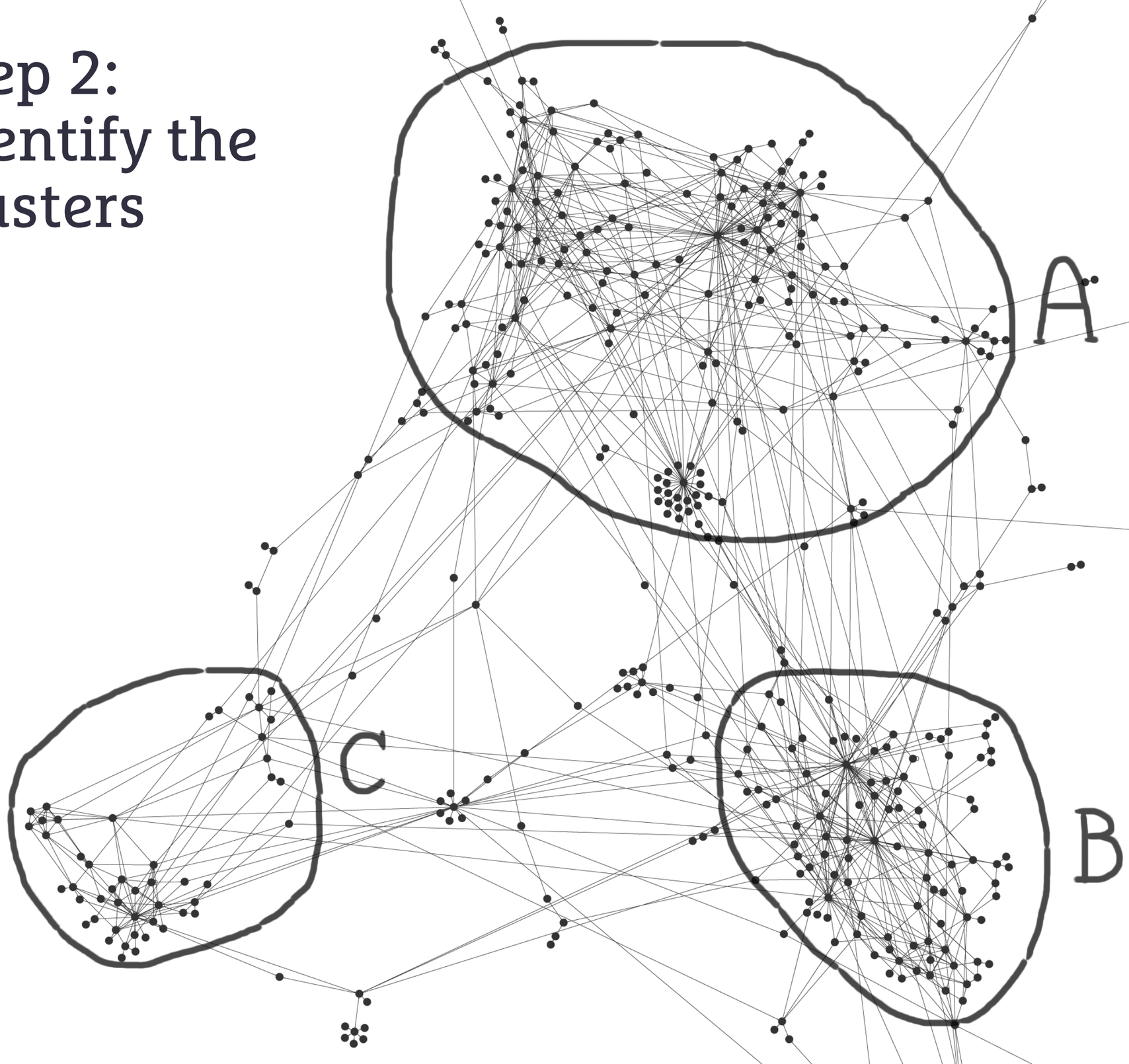
Step 7
Name and describe clusters for clarity

Notes:

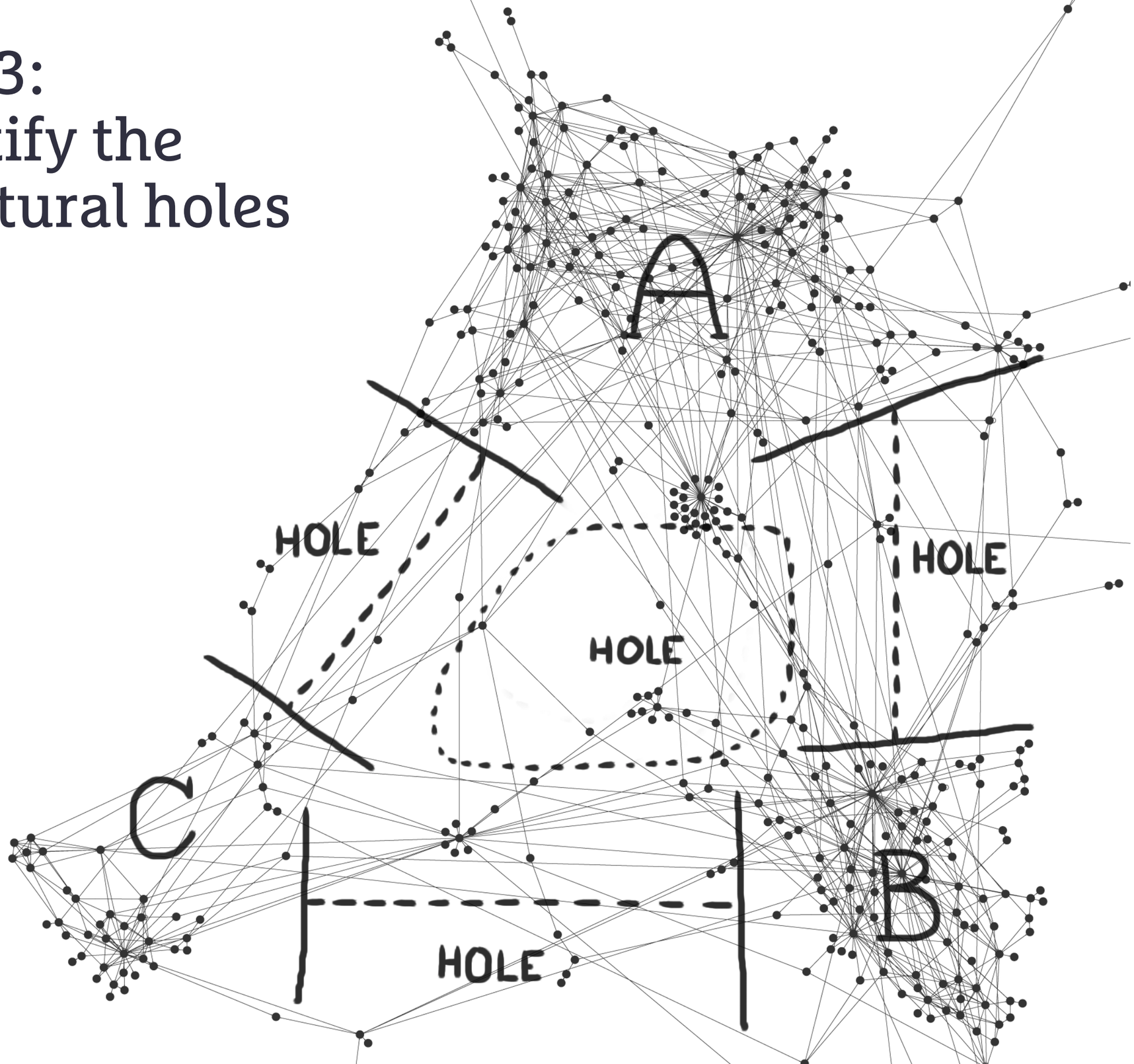
- The process is iterative at multiple levels
- Depending on your situation, insights will be treated as hypotheses or findings.

Step 1: Apply a layout

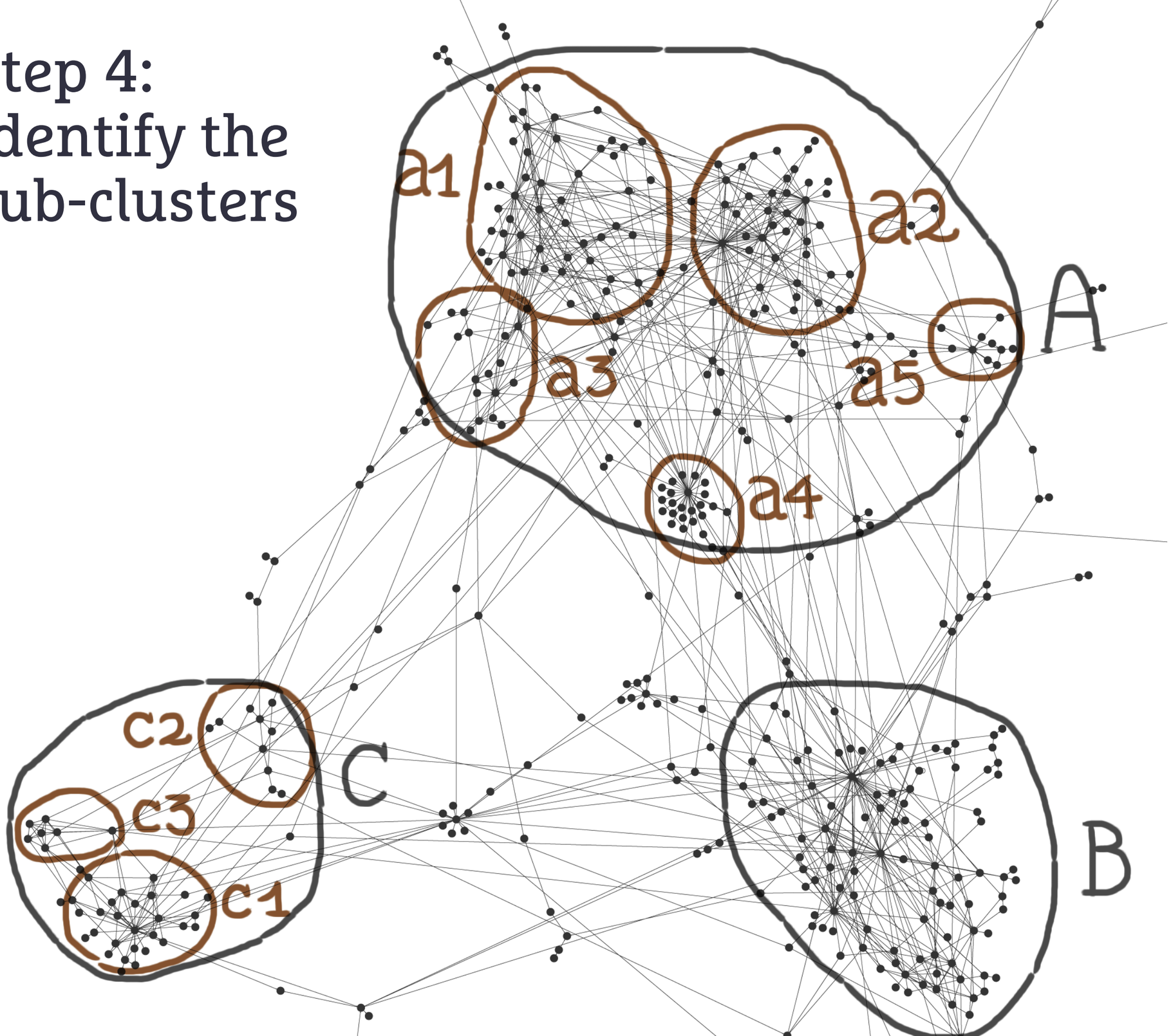
Step 2: Identify the clusters



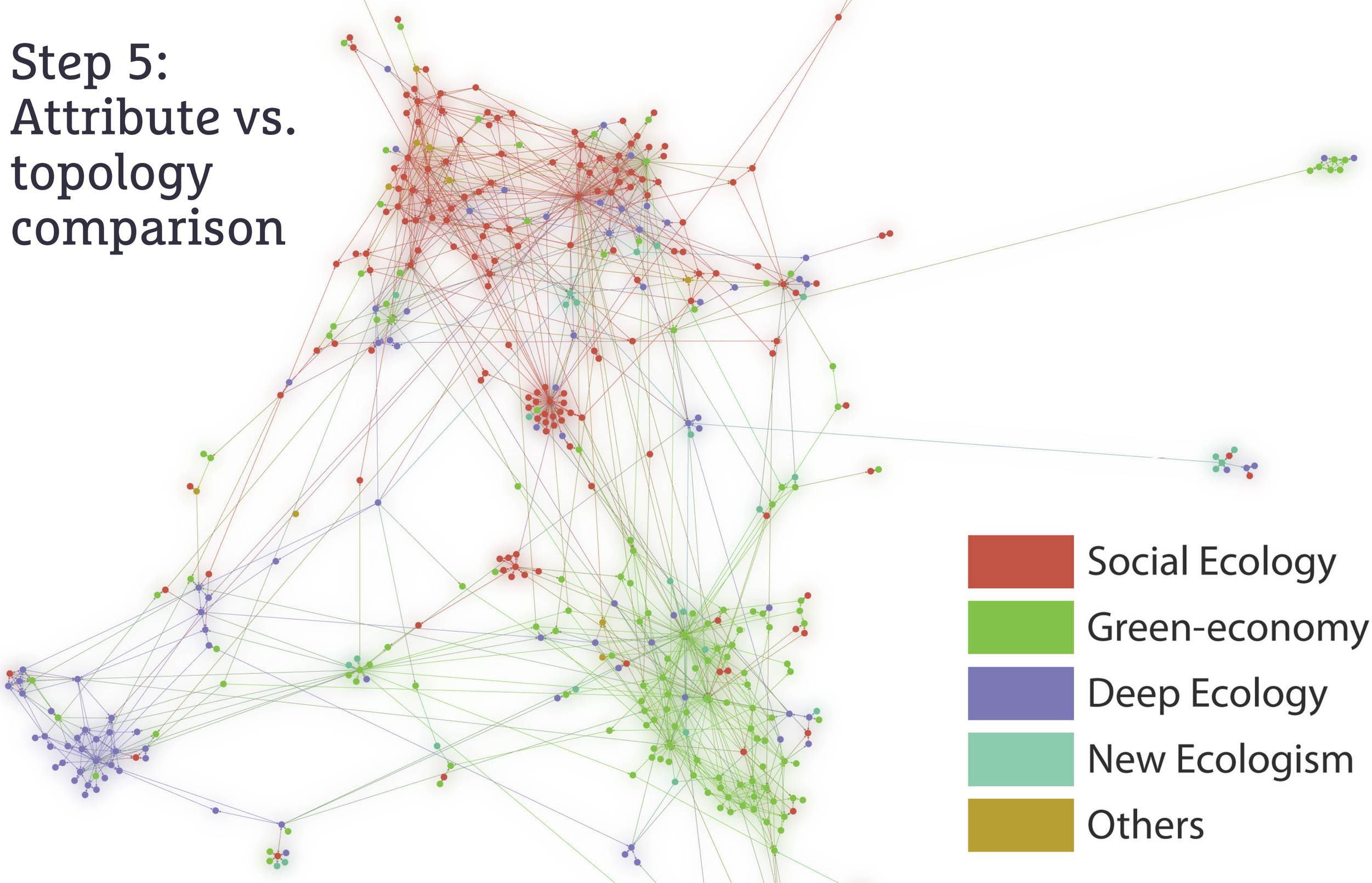
Step 3: Identify the structural holes



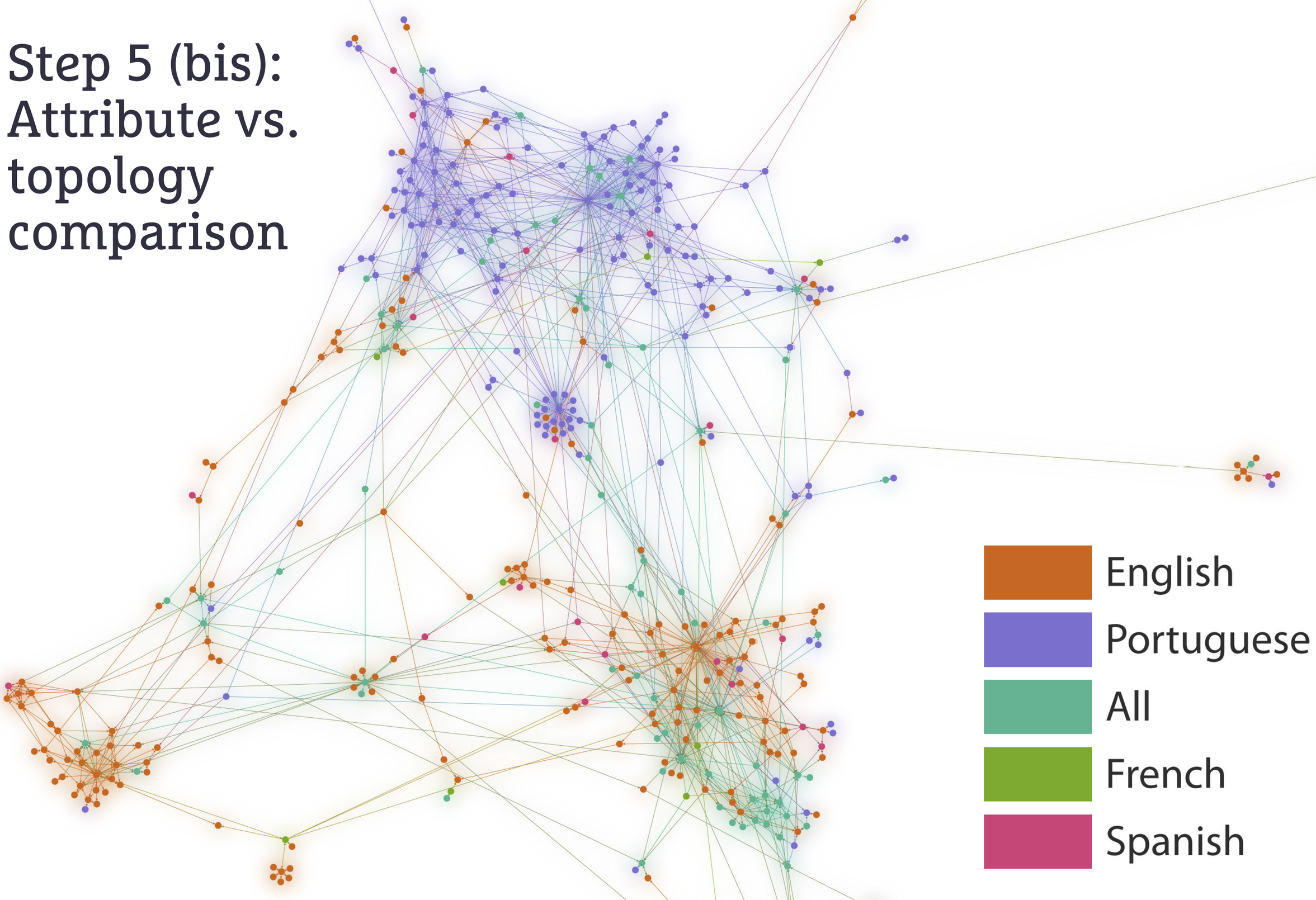
Step 4: Identify the sub-clusters



Step 5: Attribute vs. topology comparison



Step 5 (bis): Attribute vs. topology comparison



Step 6: Nodes in specific situations

Identify nodes in special situations:

- central
- bridges
- off-topic

Step 7: Name & describe clusters

- Cluster names are convenient
- But they are reductive: complete with a description

Social Ecology

Green-economy

Deep Ecology

New Ecologism

Others

Thank you for your attention

@jacomyma
reticular.hypotheses.org
Mathieu.Jacomy@gmail.com