tantlab

Visual Network Analysis

Practical recipe

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Mind the 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)
		Id		Source	Target
		pan-european identity		counter-reformation	european wars of religion
		europe		counter-reformation	catholic-protestant relations
		european integration		euroregion	north/south ministerial council
		united states of europe		euroregion	british-irish council
		names of european cities in differe...		euroregion	european grouping for territorial cooper...
		history of europe		euroregion	eurodistrict
		pro-europeanism		european grouping for territorial cooper...	euroregion
		pan-nationalism		eurodistrict	euroregion
		europhere		mediterranean europe	mediterranean basin
		pan-european nationalism		mediterranean europe	euromed
		archaeogenetics		mediterranean europe	eastern europe
		economy of the european union		europe	european games
		modernity		europe	european capitals and cities of sport fed...
		genetic history of indigenous peopl...		europe	european youth capital
		european games		europe	european region of gastronomy
		genetic history of europe		europe	european capital of culture
		european capital of culture		europe	telecommunications in europe
		commonwealth games		europe	healthcare in europe
		enlargement of the european union		europe	economy of the european union
		telecommunications in europe		europe	pan-european identity
				europe	largest urban areas of the european union
				europe	largest cities of the european union by p...
				europe	european union statistics
				europe	area and population of european countries

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

DATA

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

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

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...

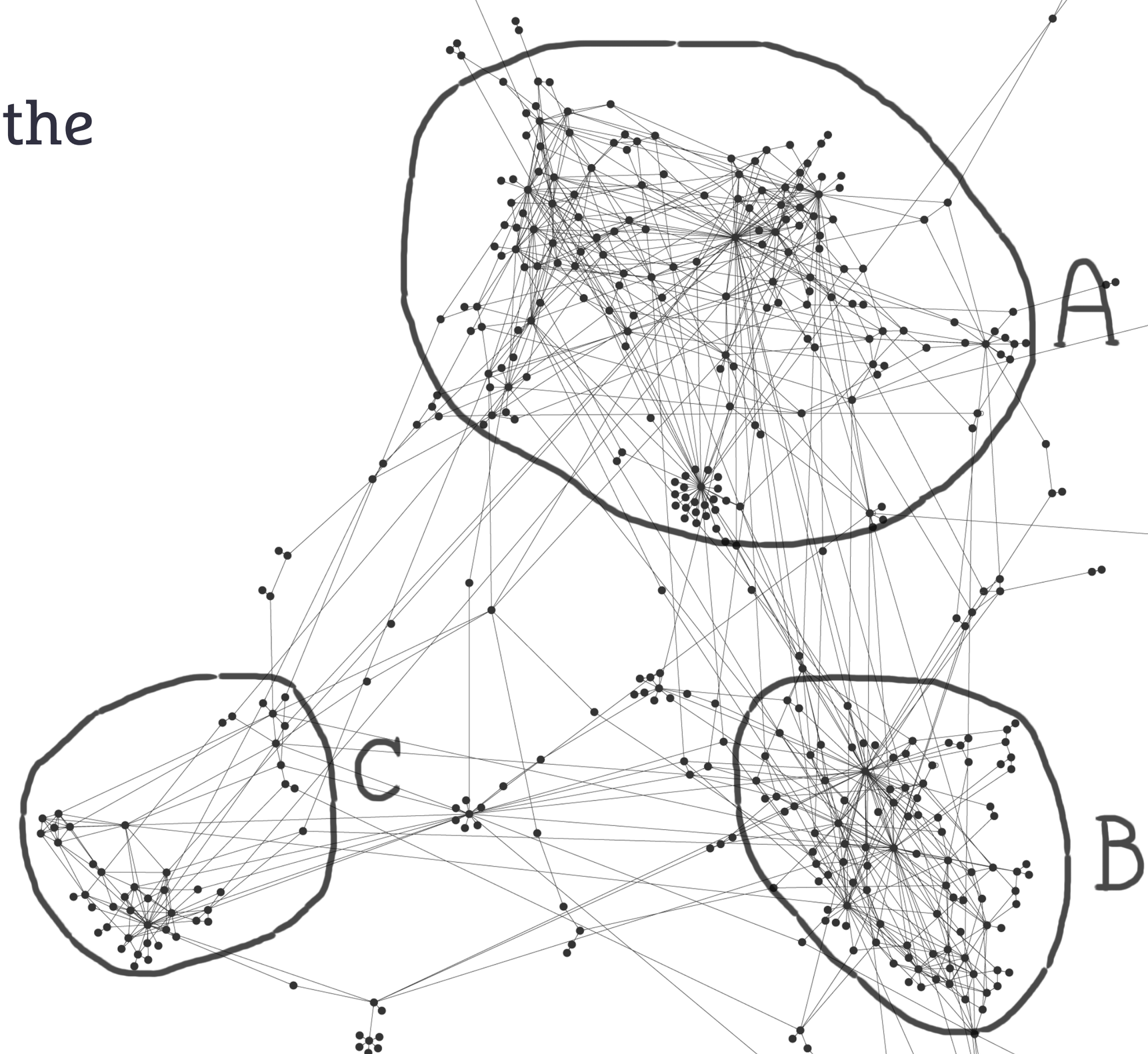
Step 7

Name and describe clusters for clarity.

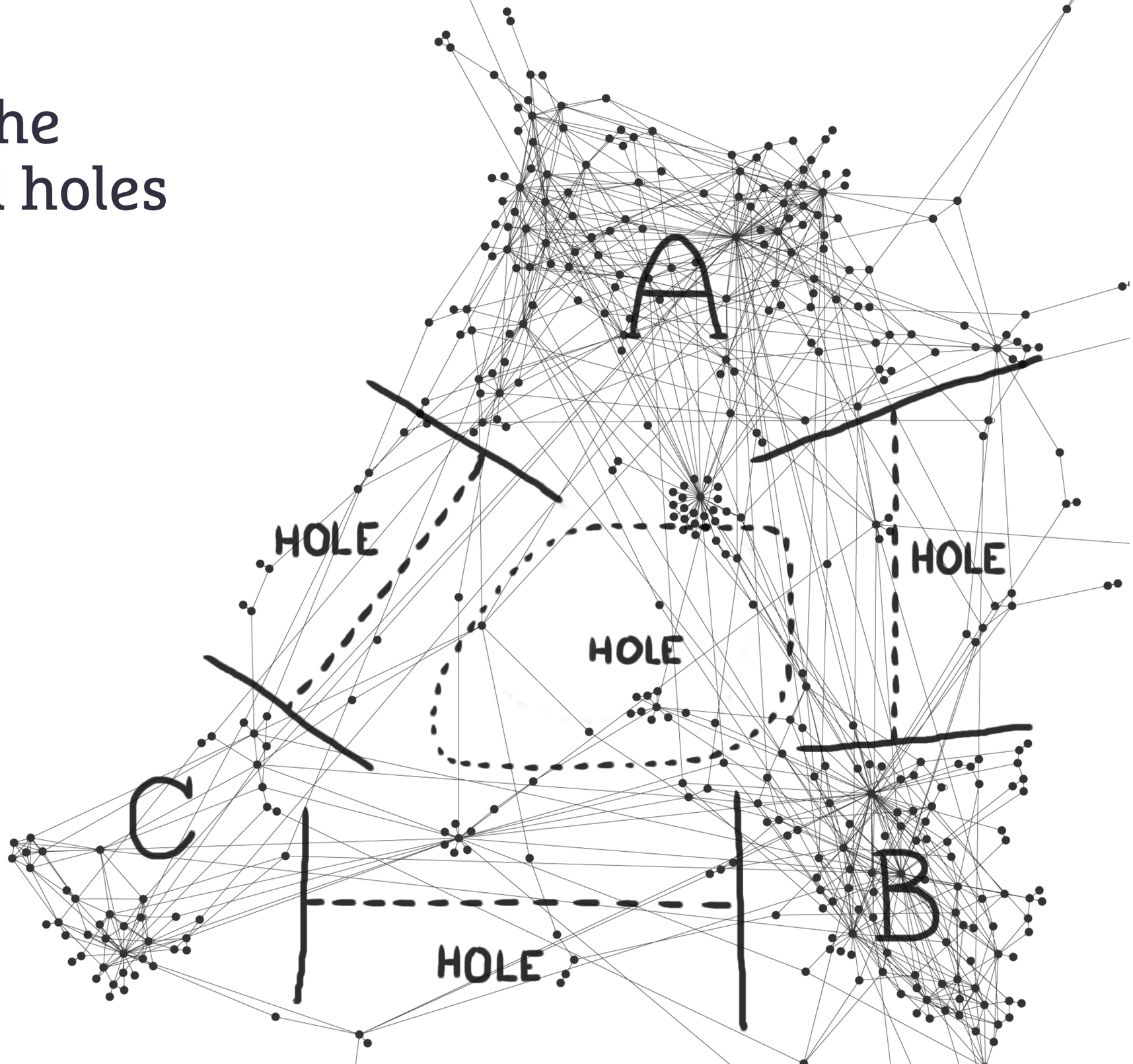
Note: the process is iterative at multiple levels. Depending on your situation, insights will be treated as hypotheses or findings.

Step 1: Apply a layout

Step 2: Identify the clusters

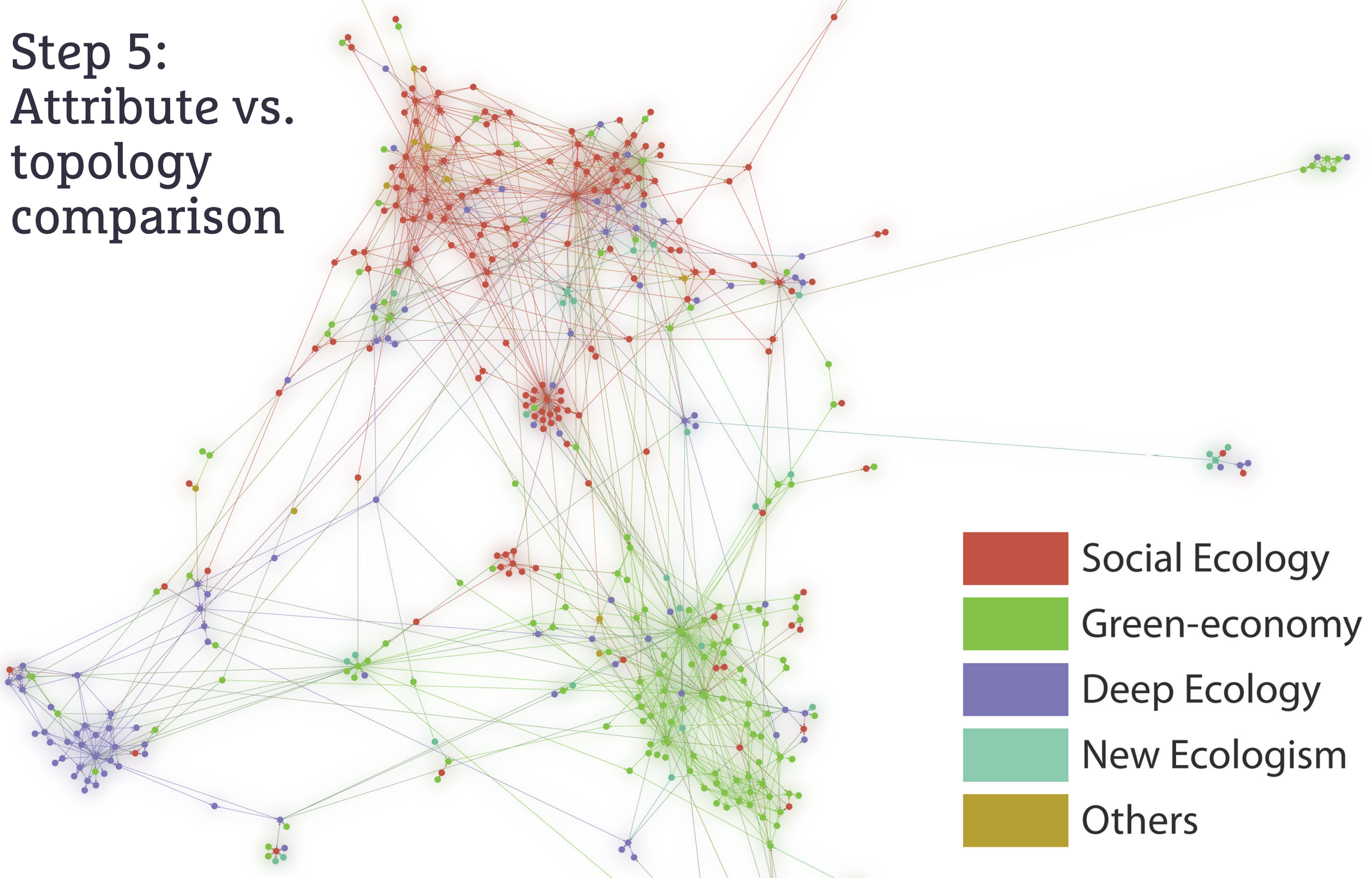


Step 3: Identify the structural holes

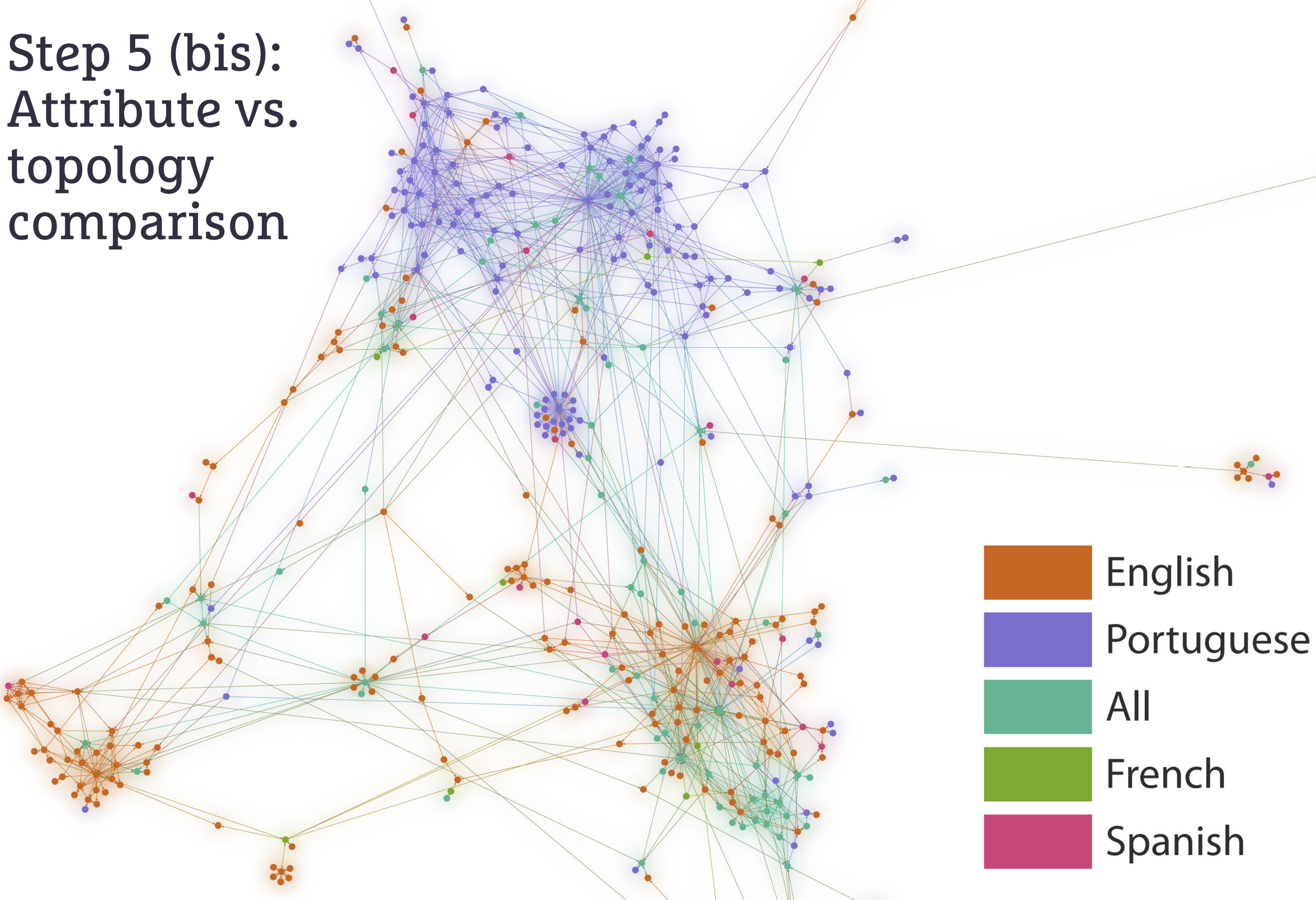


Step 4: Identify the sub-clusters

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.

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http://reticular.hypotheses.org