Network Visualisation / Visual Network Analysis

Network visualisation, or visual network analysis, provides a way to explore peace and conflict through relationships between actors, places, institutions, infrastructures, and other entities. A network represents these entities as **nodes** and their relationships as **edges**. Nodes can be positioned, designed, or colour-coded according to attributes such as actor type, institution, nationality, location, or relationship type. Edges are connections between them which can be represented in different ways to show the direction, type, or strength of a relationship. This makes complex relational structures and group dynamics within networks more visible to explore patterns that may be difficult to identify from data presented in tables.

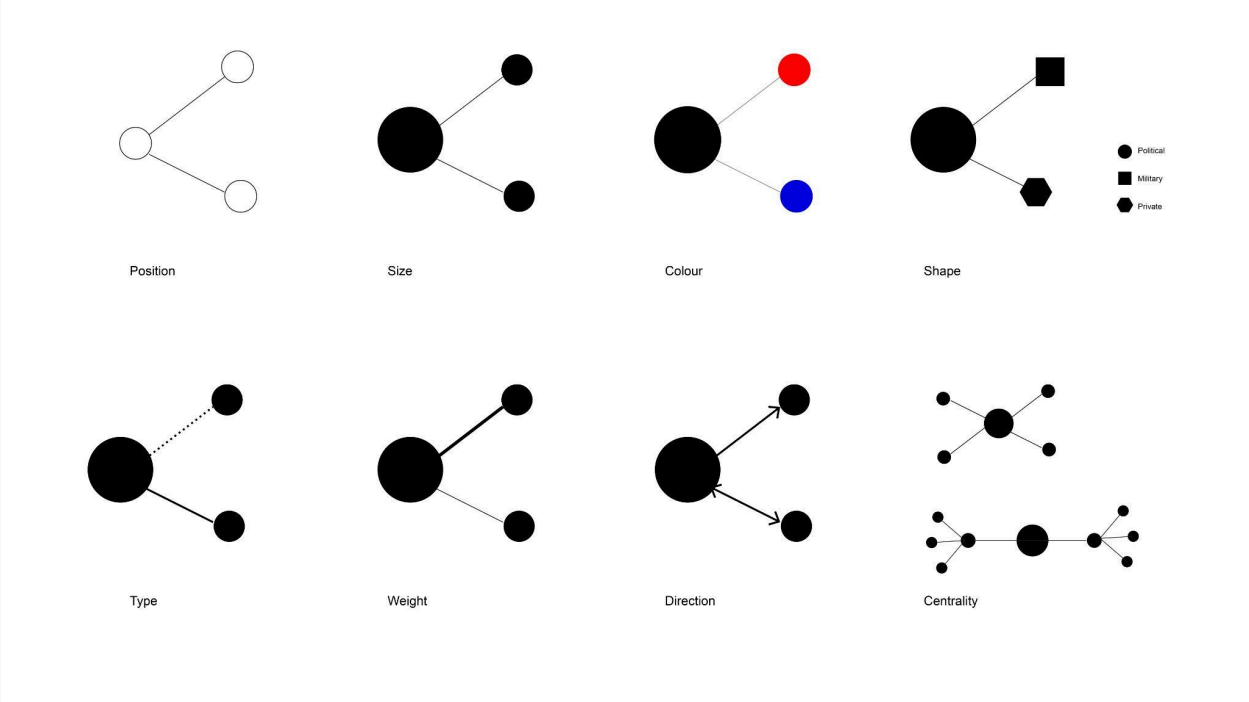
This means that visualisation is not simply about producing an attractive diagram, but it actively supports analytical questions: **What relationships become visible through patterns? What drives these patterns? Who or what occupies strategic positions? What remains outside the network**? Network visualisation can help examine **network structures, communities and subnetworks, the position and centrality of specific actors,** and **connections between groups perceived as separate**. Measures such as degree centrality can highlight highly connected actors, while betweenness centrality can identify brokers who connect different parts of a network. Visualisation can therefore reveal how influence, resources, or information circulate, including through informal patron-client networks. Networks can also be **geographical,** connecting actors to places, infrastructures, events, or territories and by complementing network diagrams with maps and geovisualisations.

NOTES ON THE VISLAB (KonKoop Multiperspective Laboratory for Peace and Conflict Cartography: visualisingconflictpeace.de)

The VisLab was established in 2023 within the KonKoop research network (konkoop.de) to support peace and conflict researchers in visualising their results and insights. In addition, we also work on critical analysis of maps and geovisualisations, as well as production of critical and multiperspective mappings. In the period of March 2026 to March 2028, we offer support to external researchers affiliated with KonKoop partner institutions and/or involved in their activities. Please check visualisingconflictpeace.de for examples of visualisations and educational materials (tools and readings) which can help you conceptualise and visualise your work. For the authors involved in the KonKoop workshops, we provide drop-in consultation hours: Please contact us via M_Zuljevic@leibniz-ifl.de to schedule a one-on-one 30-minute consultation.

HOW?

Network visualisations use a set of visual variables to make relational structures legible. **Nodes** can vary in size, colour, shape, and position, while **edges** can vary in width, direction, and type to represent the strength or nature of connections. Node colour or shape can encode attributes such as **actor type** or nationality, while size and position can represent measures such as **degree centrality**. **Betweenness centrality** can highlight actors that connect otherwise separate groups, even when they are not the most directly connected. Network connections may be **directed** and **weighted** to show how actors are related to each other and with what strength, with nodes connected across different spatial scales ranging from local and regional to national, transnational, or global. These visual variables can encode analytical categories such as **actor type**, **exchanged resources** (financial, military, narrative, political), and **alignment** (supported, neutral, contesting).



CRITICAL VISUALISATION QUESTIONS

From a critical visualisation perspective, researchers should ask what is simplified, excluded, or made prominent through the visualisation, and at what level of detail the network remains meaningful. This includes being transparent about data sources, gaps, assumptions, and uncertainty, particularly when relationships are inferred rather than directly documented. Researchers should also question how visual conventions shape interpretation: does colour

reinforce stereotypes or political categories, does node size imply importance, and does spatial proximity suggest relationships that do not actually exist? Critical network visualisation therefore requires asking whose perspective defines the network, which relationships are included or absent, how categories were constructed, and what the visualisation encourages viewers to conclude. Researchers can also consider specific strategies for articulating, acknowledging or highlighting critical concerns, for example use of blurred shapes or dashed lines to indicate a degree of uncertainty for nodes and edges. Such strategies can also be simple inclusions of short statements within the visualisations which indicate any concerns with how data was visualised.

TOOLS

Basic network data can often be structured as a simple table of source, target, relationship type, and weight, then explored using accessible visualisation tools. We propose two tools that allow researchers to turn relational data into interactive network visualisations, but they differ considerably in accessibility, flexibility, and technical complexity.

Gephi [Gephi - The Open Graph Viz Platform]
A powerful, free, open-source desktop application suited to more complex network analysis and larger datasets. It offers extensive control over network layouts, filtering, clustering, and measures such as centrality. Researchers can import structured network data, typically as CSV, GEXF, GraphML, or spreadsheet-derived tables. It is particularly useful when the network itself is the object of systematic analysis, although it has a steeper learning curve.

Kumu [https://kumu.io/]
A more accessible, web-based platform designed for creating and communicating network maps with less technical expertise. It provides an intuitive interface for importing and organising data, with visual attributes that can be customised relatively easily. Data can be imported from CSV spreadsheets, making it suitable for researchers who already organise relationships in tables. Kumu is particularly useful for exploratory work, collaborative projects, and communicating complex relationships to non-specialist audiences.