

# Towards a Format for Describing Networks

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# Outline

Towards a  
Format for  
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Networks

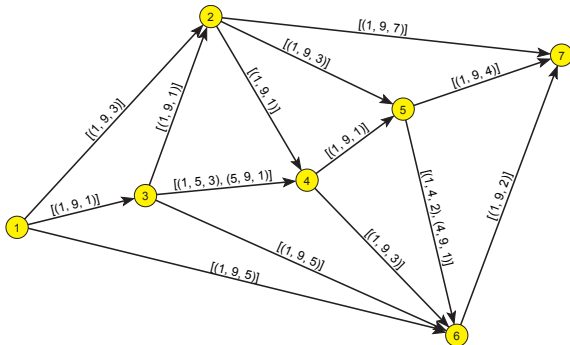
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Current version of slides (October 4, 2025 at 01:03): [slides PDF](#)

<https://github.com/bavla/OpenAlex>

# Networks

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Formally, a *network*  $\mathcal{N} = (\mathcal{V}, \mathcal{L}, \mathcal{P}, \mathcal{W})$  consists of:

- a *graph*  $\mathcal{G} = (\mathcal{V}, \mathcal{L})$ , where  $\mathcal{V}$  is the set of nodes and  $\mathcal{L} = \mathcal{E} \cup \mathcal{A}$  is the set of links. A link  $e \in \mathcal{L}$  is either directed – an arc  $e \in \mathcal{A}$ , or undirected – an edge  $e \in \mathcal{E}$ ,  $n = |\mathcal{V}|$ ,  $m = |\mathcal{L}|$
- $\mathcal{P}$  is a set of *node value functions* / properties:  $p: \mathcal{V} \rightarrow A$
- $\mathcal{W}$  is a set of *link value functions* / weights:  $w: \mathcal{L} \rightarrow B$

Sometimes, implicit additional information/data about values is provided in the specifications of properties: (a) algebraic structures, and (b) properties of values.

There are numerous tools, programs, and packages available for network analysis, each utilizing different formats. Network datasets are available in multiple repositories.

For detailed lists of network analysis resources with links to web pages, see [GitHub/bavla/NetsJSON/Info](https://github.com/bavla/NetsJSON/Info).

# Formats

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The simplest way to describe a network  $\mathcal{N}$  is by providing  $(\mathcal{V}, \mathcal{P})$  and  $(\mathcal{L}, \mathcal{W})$  in a form of two tables.

To include metadata in the network description and to provide support for structured property values (such as lists of words, distributions, temporal quantities, etc.), we are developing a format called netsJSON.

Exchange and archiving. Our contribution contains

Yet another format only makes sense as a project of a larger community of users in the field of network analysis.

# netsJSON

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{
  "netsJSON": "basic",
  "info": {
    "org": 1, "nNodes": n, "nArcs": mA, "nEdges": mE,
    "simple": TF, "directed": TF, "multirel": TF, "mode": m,
    "network": fName, "title": title,
    "time": { "Tmin": tm, "Tmax": tM, "Tlabs": {labs} },
    "meta": [events], ...
  },
  "nodes": [
    { "id": nodeId, "lab": label, "x": x, "y": y, ... },
    ***
  ],
  "links": [
    { "type": arc/edge, "n1": nodeID1, "n2": nodeID2, "rel": r, ... },
    ***
  ],
  "data": {
    "data1": description1,
    ***
  }
}
```