



European
Network of
Earth
Observation
Networks
Plenary Workshop

Building a collaborative ENEON to inform policies
and actions to address complex societal challenges

Mapping the Network Landscape
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IIASA. Schlossplatz 1 - A-2361 Laxenburg, Austria



Introduction

- One of the main objectives from ConnectinGEO:
 - **Enable a European Network of Earth Observation Networks:**
 - A forum to discuss joint strategies and harmonize across the observation networks
 - Facilitate access and to share the information from EU observing systems
- First, we needed to map all in-situ networks working in EO in Europe, know its relations and dependencies



www.eneon.net

European in-situ Networks

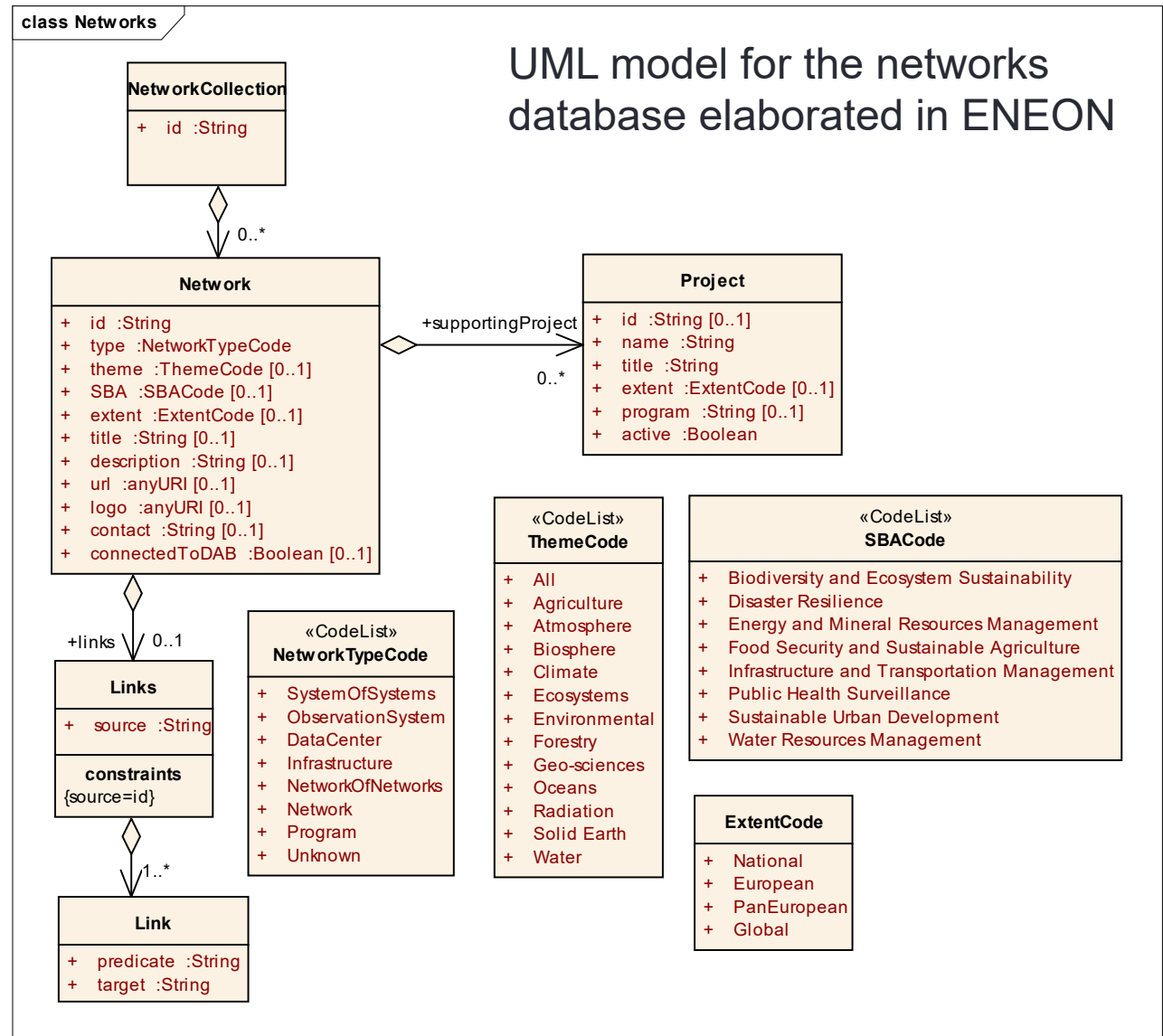
- Mapping the in-situ networks at the European level has lead to the discovery of a large, complex and incomplete system.
- There's coordination within each topic, but less interaction and knowledge across them.
- Different semantics using the name "*Network*".
 - We have identified:
 - **ObservationSystem** is a network that is building some sensor network and collecting data with them
 - **SystemOfSystems** is a network that has the objective of integrating "ObservationSystems" in a bigger structure.
 - **Infrastructure** is an "informatics" system that connects data, services and sensors to facilitate access to or processing of data. . . .

- **DataCenter** is a data repository that is not really a network but needs a network to exist. It generally does not own the data but aggregates it in a single repository (in opposition to a system of systems that has a federated structure). Actually it could be argued that this category is out of scope of the ENEON but there are cases where if not included the complete picture is not understood (e.g. the WMO thematic data centers).
- **Program** is a network created/financed directly by the decision makers that is neither an observing system nor an infrastructure but e.g. a coordination effort.
- **Network** is anything that cannot be classified in the previous categories.
- **NetworkOfNetworks** is a network connected to other networks with the intention to aggregate them.

Mapping the networks

- Before creating our graph data model, previous initiatives using metadata model to describe networks were analyzed, mainly:
 - the Network Metadata Model (NMM), responding to the ILTER and LTER Europe requirements. Collect basic information on the network itself as well as the associated information provided within DEIMS (Drupal Ecological Information Management System). Includes the links to associated people as well as research sites and datasets. For Networks, Research sites can be managed and the status of affiliation. The content type applies to ILTER/LTER networks especially.
 - The NMM misses the relations between networks
- We have adopted the NMM
 - adding the necessary relations between networks
 - the financing projects
 - the link with SBA and GEOSS

- Each individual network is defined by a reduced set of properties.
- It also includes links to other networks
 - specifies the role of the relation.



Implementation

- It is closer to the modern web technologies
 - JSON+RDF
- The network database is maintained in a JSON file that encodes the model.
 - It has been encoded in JSON-LD that can be dynamically converted into RDF and connected to the linked data
 - The JSON is validated using a JSON schema.
- The graph representation is based on an open source code available at GitHub called d3-process-map that uses the d3.js graphical library
 - The PHP server side has been removed: javascript contains all the intelligence
 - Relational role representation has been added
 - Conversion to RDF has been added (using a JSON-LD github lib.)

HTML representation of a network and export

Full text description of each network in the graph

Network for the Detection of Atmospheric Composition Change NDACC ×

NDACC is composed of more than 70 high-quality, remote-sensing research stations for observing and understanding the physical and chemical state of the stratosphere and upper troposphere and for assessing the impact of stratosphere changes on the underlying troposphere and on global climate

Properties

- *type*: ObservationSystem
- *theme*: Atmosphere
- *extent*: Global
- *contact*: NDACC-TCCON@uow.edu.au

Links to

- *connectedNetwork*: [Aerosol RObotic NETwork \(AERONET\)](#)

Export to RDF representation for exploitation in the linked data

JSON-LD: ([Download the JSON file](#))

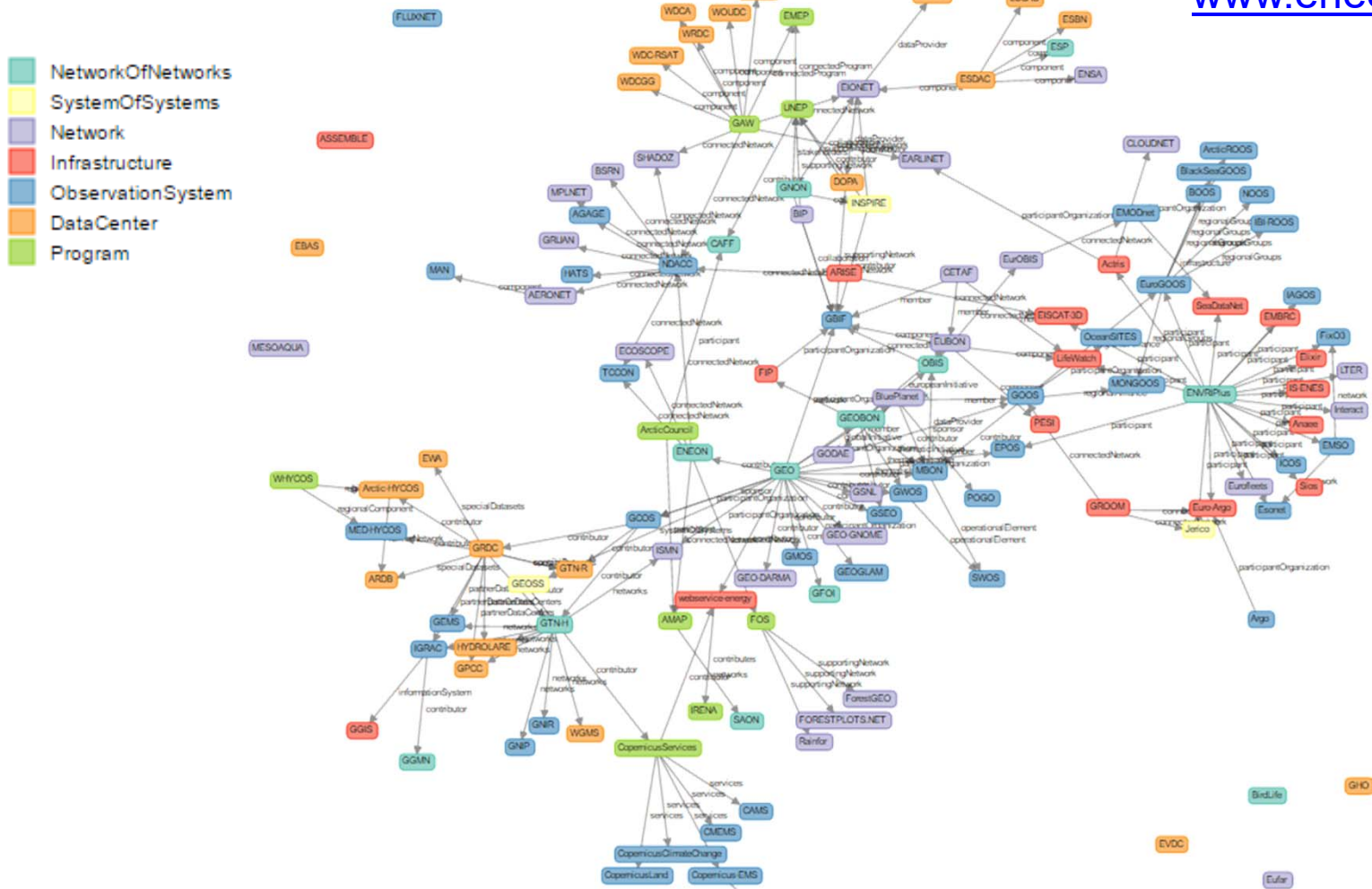
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  "id": "eneon:NDACC",
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  "theme": "Atmosphere",
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  "description": "NDACC is composed of more than 70",
  "url": "http://www.ndsc.ncep.noaa.gov/",
  "contact": "NDACC-TCCON@uow.edu.au",
  "links": {
    "source": "eneon:NDACC",
    "connectedNetwork": f
```

RDF:

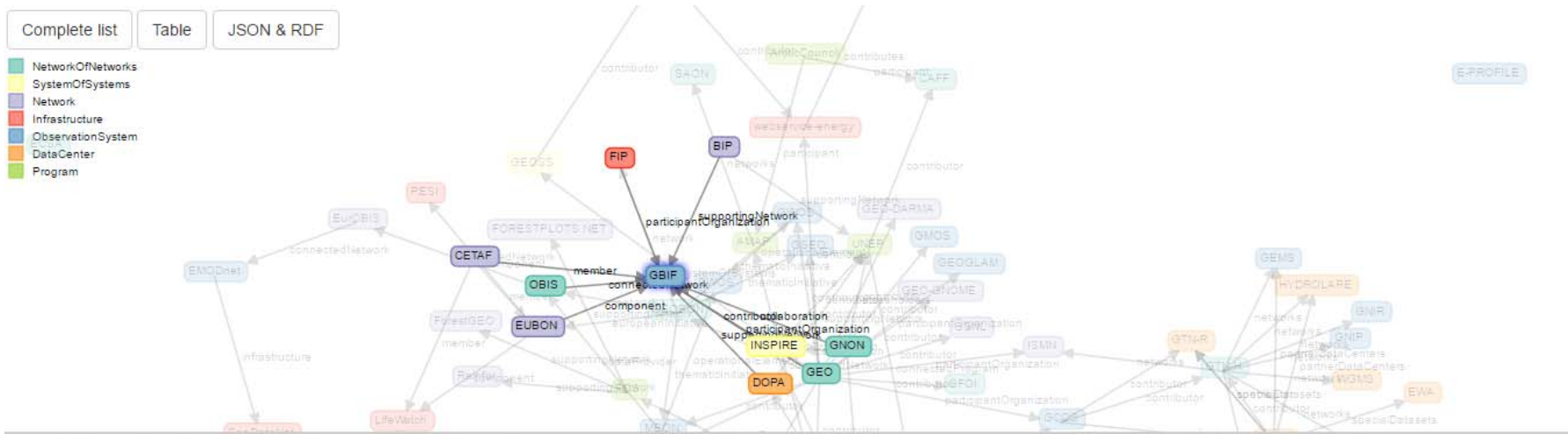
```
<http://www.eneon.net/NDACC> <http://www.eneon.net/description> "NDACC is composed of more than 70 high-quality, remote-s
<http://www.eneon.net/NDACC> <http://www.eneon.net/extent> "Global" .
<http://www.eneon.net/NDACC> <http://www.eneon.net/theme> "Atmosphere" .
<http://www.eneon.net/NDACC> <http://www.eneon.net/title> "Network for the Detection of Atmospheric Composition Change" .
<http://www.eneon.net/NDACC> <http://www.eneon.net/url> <http://www.ndsc.ncep.noaa.gov/> .
<http://www.eneon.net/NDACC> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.eneon.net/type/ObservationSys/
<http://www.eneon.net/OBIS> <http://www.eneon.net/description> "OBIS is an evolving strategic alliance of people and organizati
<http://www.eneon.net/OBIS> <http://www.eneon.net/extent> "Global" .
<http://www.eneon.net/OBIS> <http://www.eneon.net/logo> <http://www.eneon.net/graph/logos/obis.png> .
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<http://www.eneon.net/OBIS> <http://www.eneon.net/title> "Ocean Biogeographic Information System" .
<http://www.eneon.net/OBIS> <http://www.eneon.net/url> <http://www.obis.org/>
```


The result of this implementation has led to the establishment of an initial graph of European in-situ networks.

www.eneon.net/graph



User feedback



Global Biodiversity Information Facility GBIF

Is an inter-governmental organization borned in 2001 that currently comprises 53 governments and 43 international organizations. GBIF is a network of national nodes with an international mandate settled in Copenhagen. The main goal of GBIF is to provide free and open online access to global biodiversity data supporting at the same time scientific research, conservation and sustainable development

[Add user feedback](#) or [view previous feedback](#) about this network

Properties

- *type*: ObservationSystem
- *theme*: [Biosphere]
- *SBA*: [Biodiversity and Ecosystem Sustainability]
- *extent*: Global
- *contact*: info@gbif.org

- If you see something wrong or missing, please provide feedback!!

Conclusions

- Shows a large, complex and incomplete system
- Helps in discovering gaps/redundancies and missing links
- We need help in perfecting and updating. Give us feedback
- It will be included in the project sustainability plan
- Could be generalized to Global scope in GEOSS
- Easy to move/transfer/extended to other servers (no server side technology)

THANKS!

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