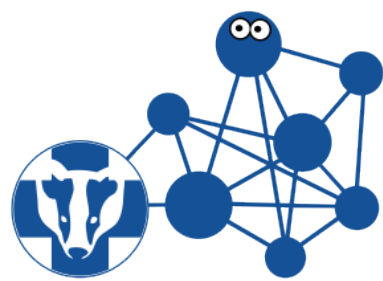
MeDaX - a knowledge graph for biomedicine

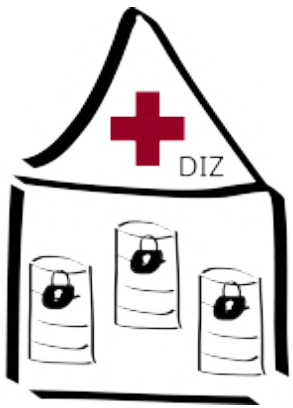
Judith Wodke

"Beyond Silos: Next Steps in Research Data Management"
Frühjahrstreffen der FG Datenbanken
Jena, 11th of March, 2024



Clinical care data

- Diverse stakeholders



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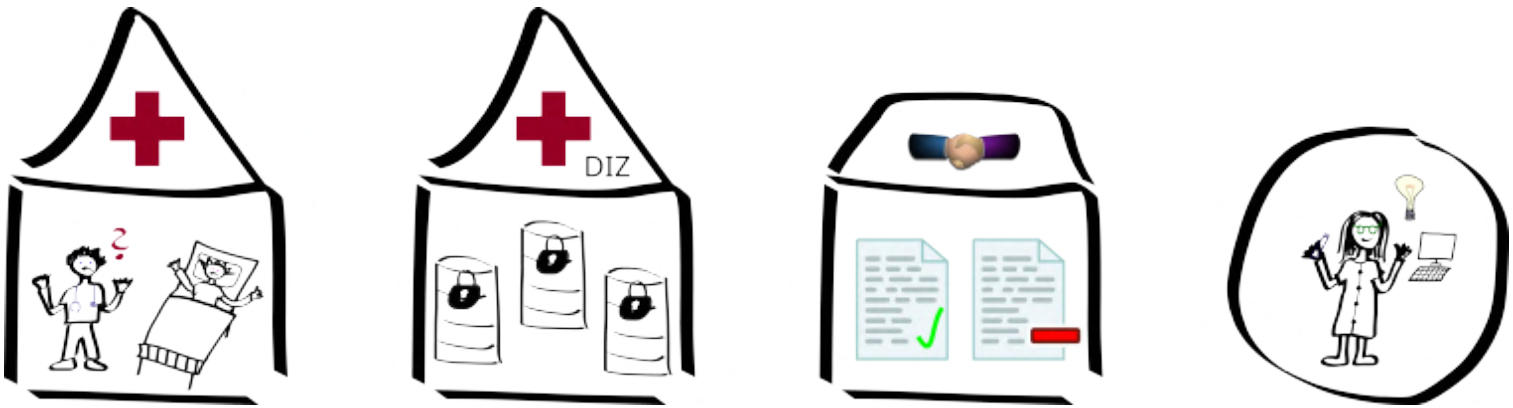

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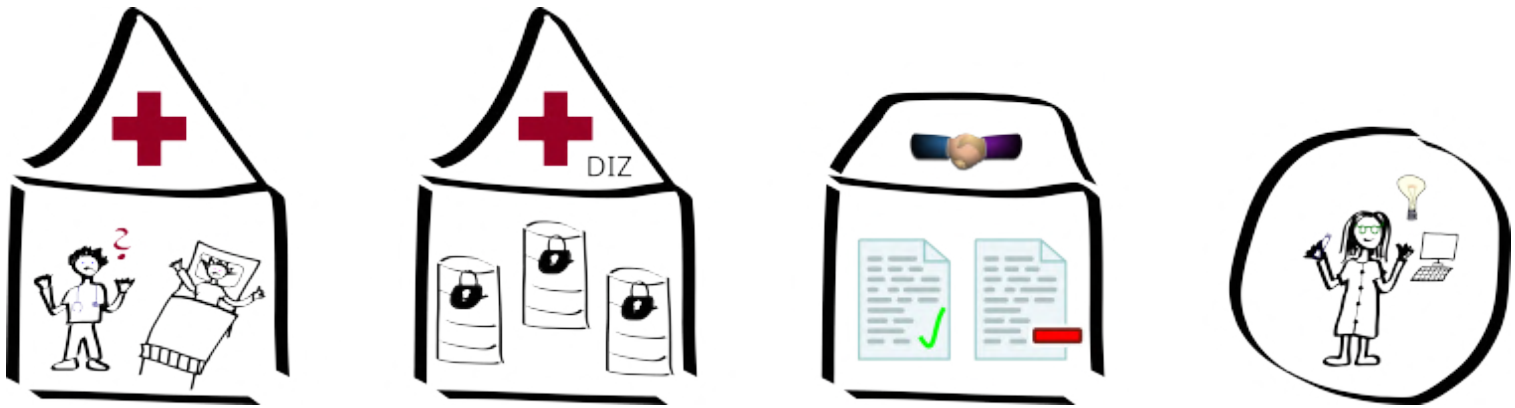

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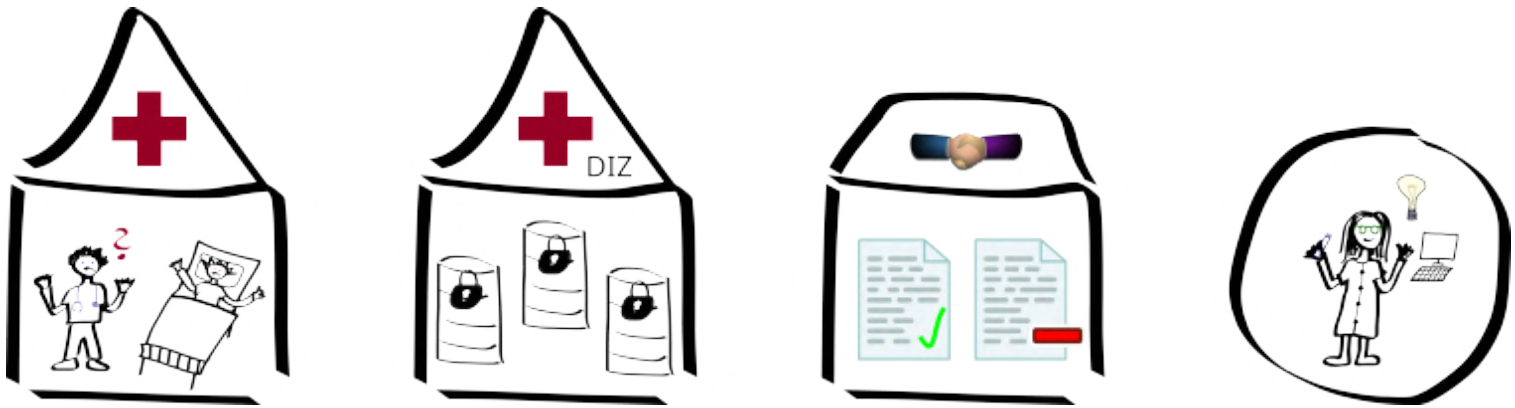

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- Juridical regulations on different levels (local, national, international)
- clinical data quality != experimental data quality

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- **note:** work in progress, slow process, highly regulated, and many domain experts

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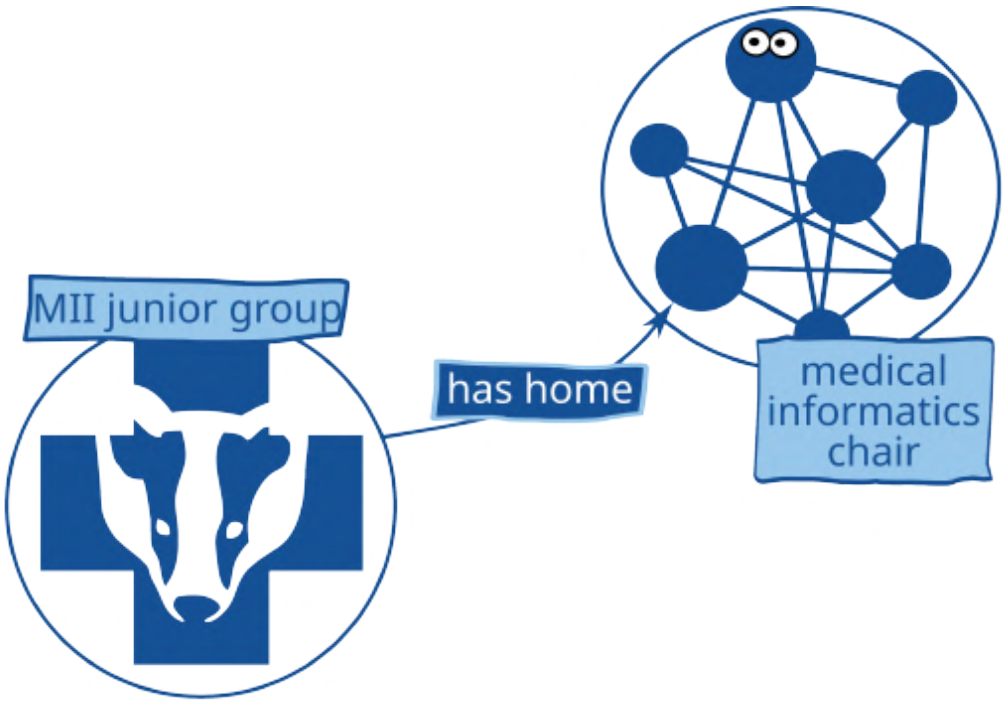

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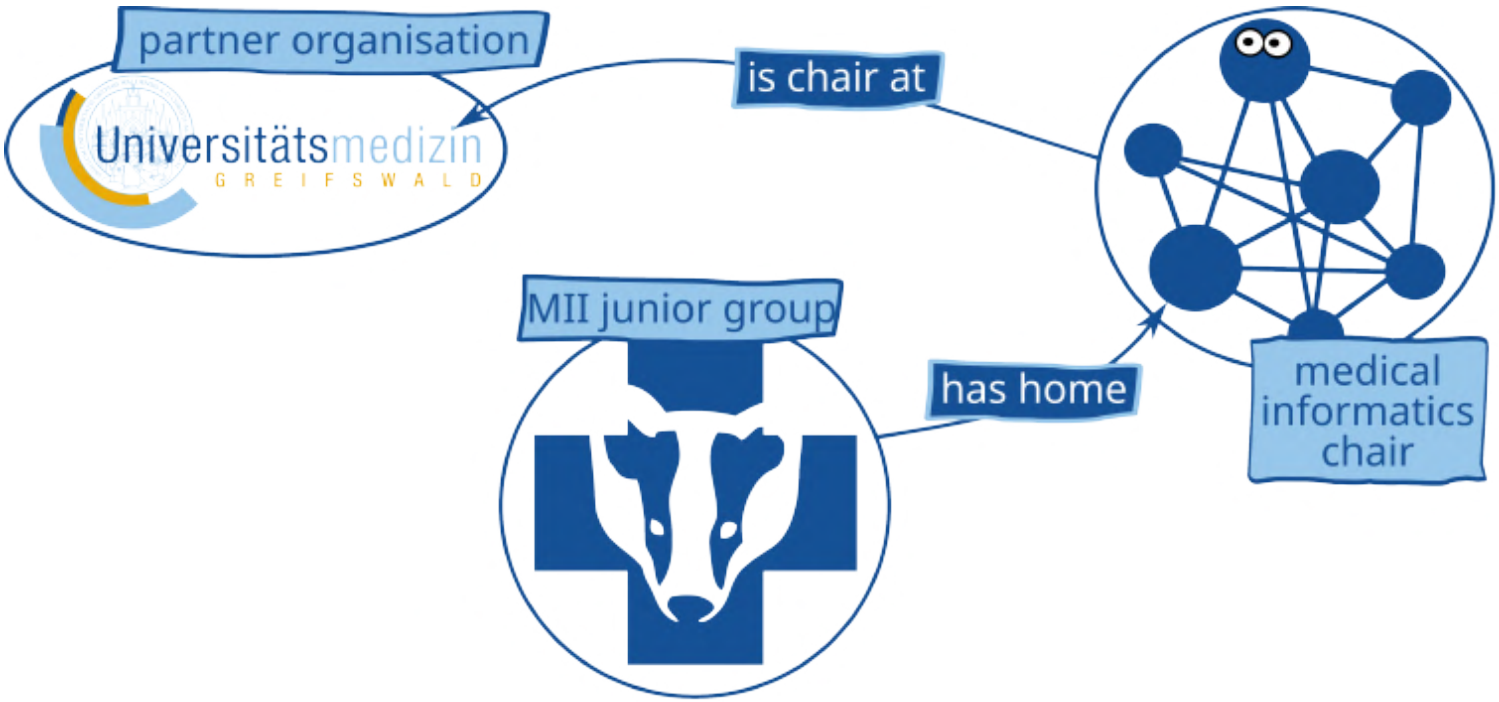

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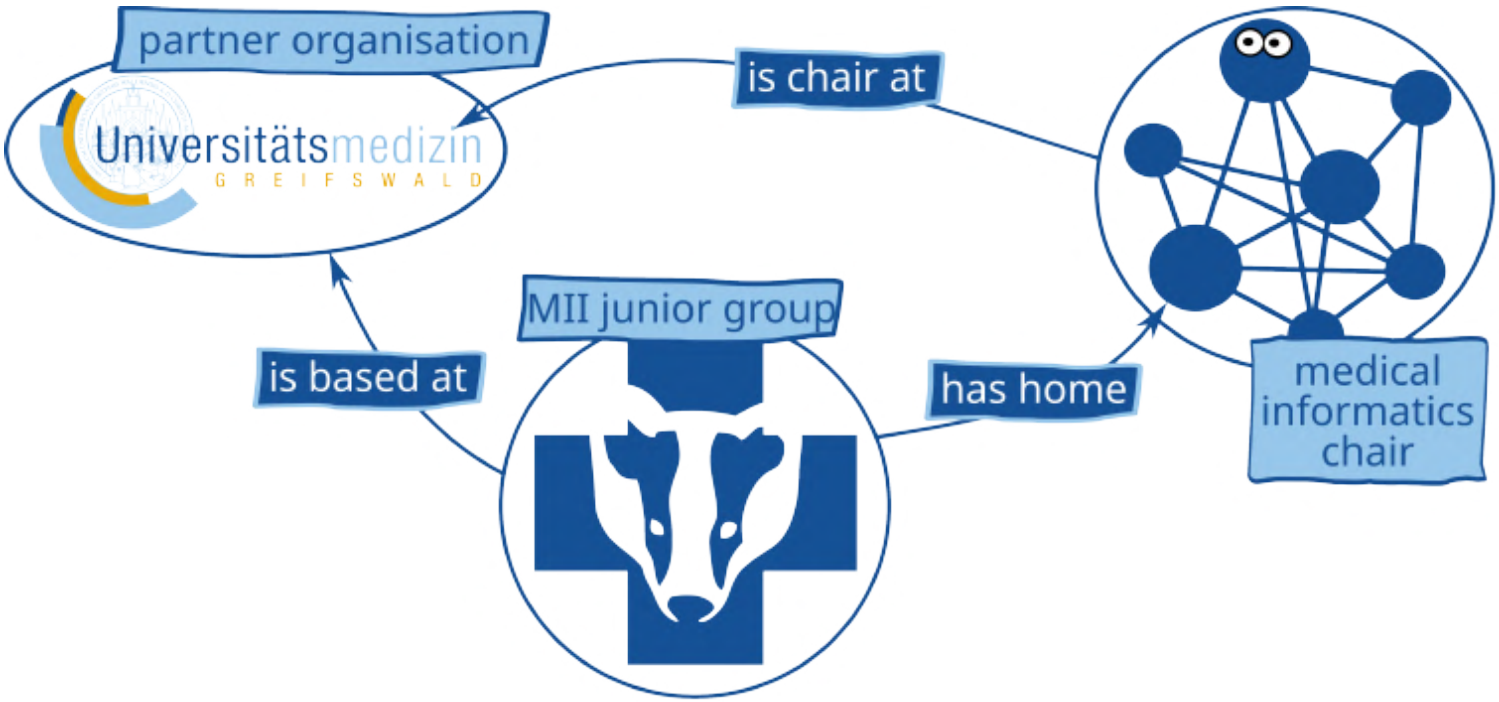

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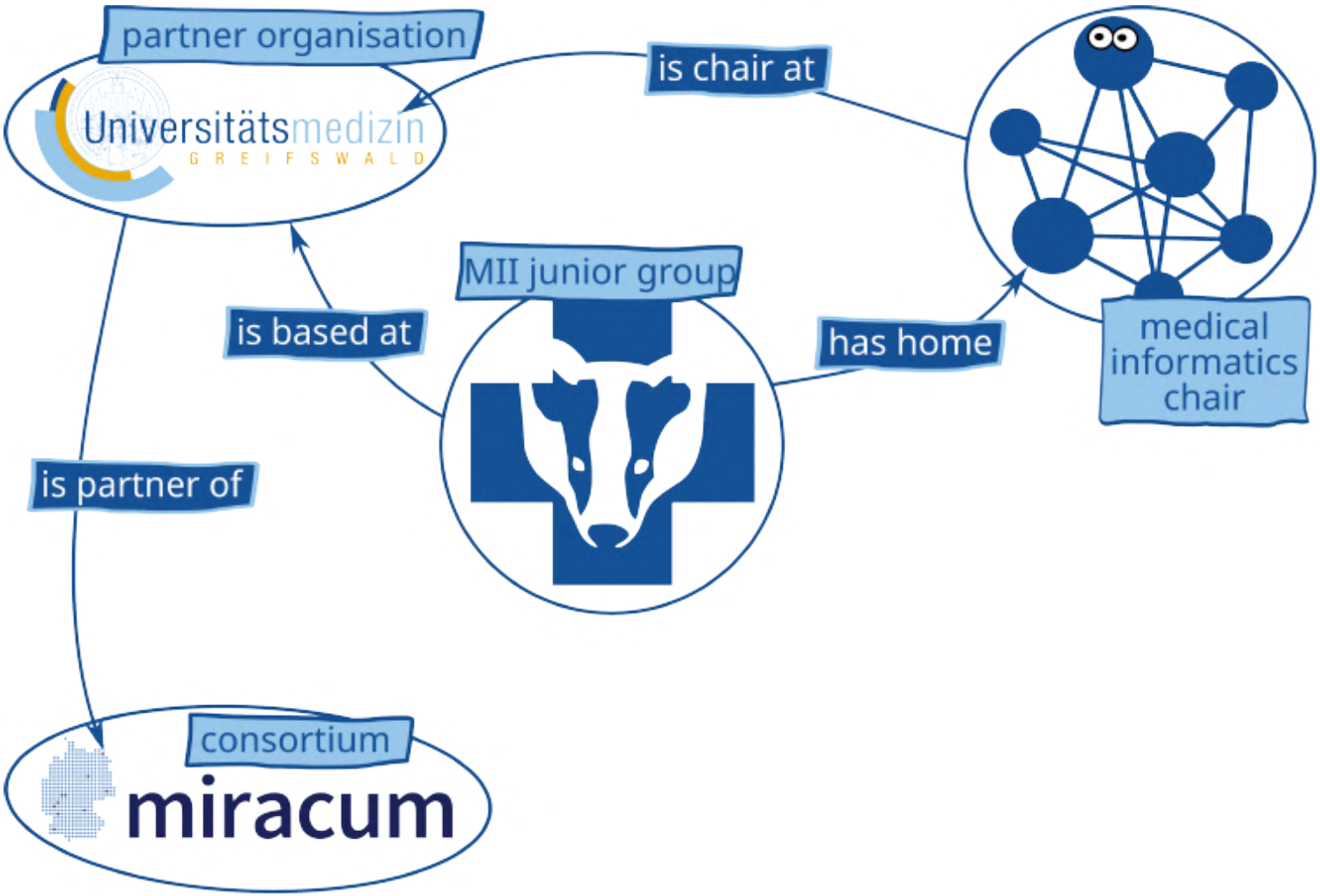

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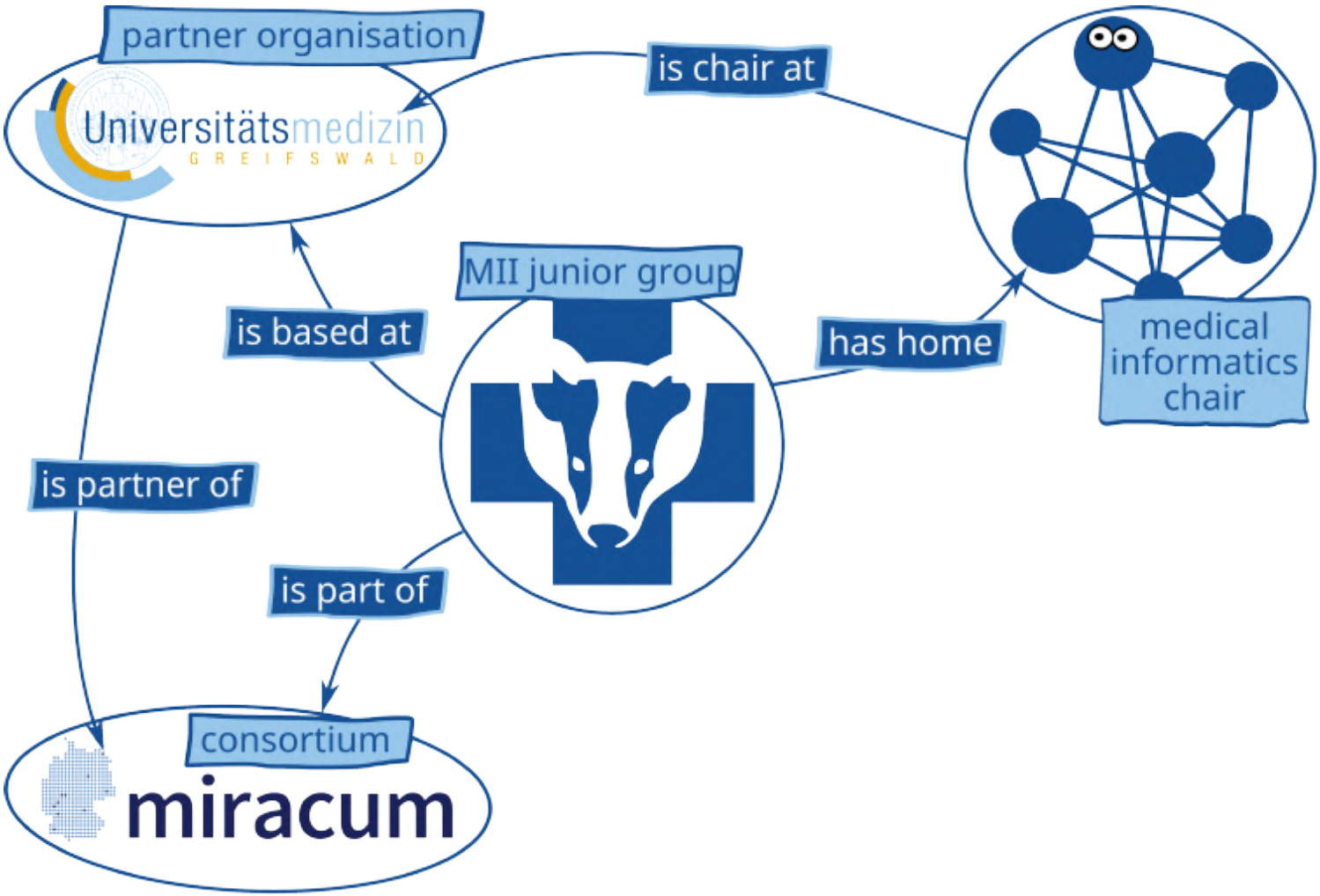

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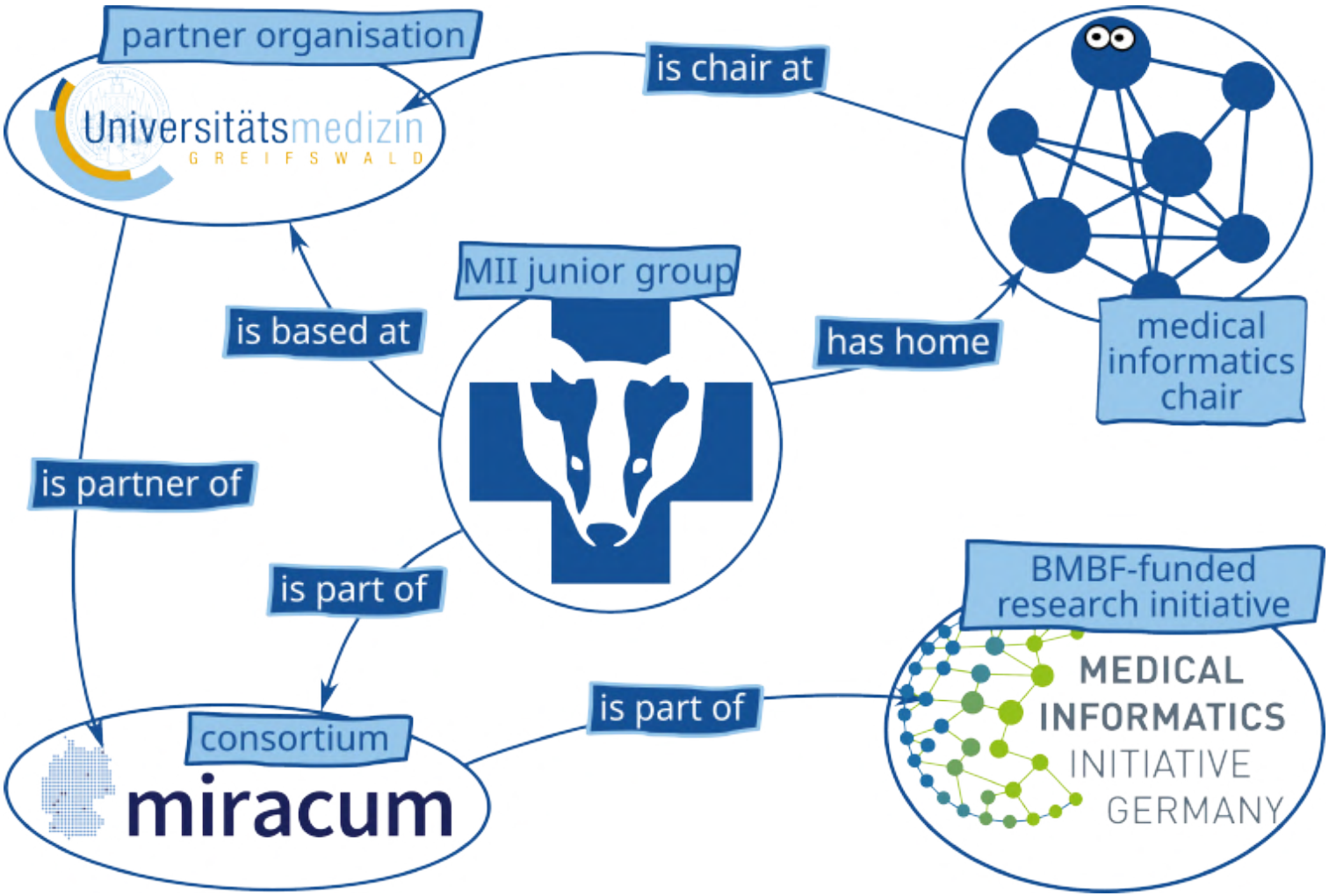

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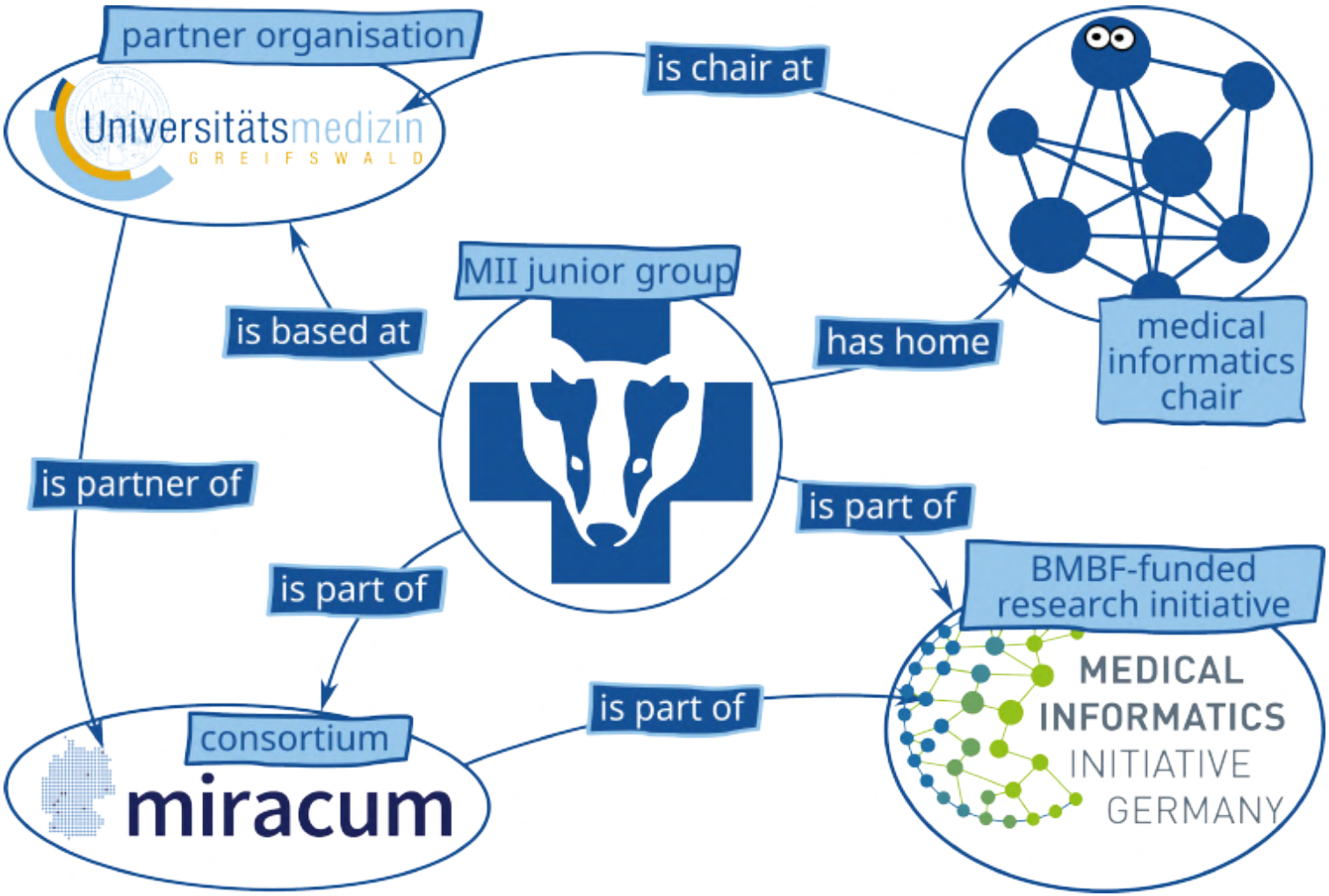

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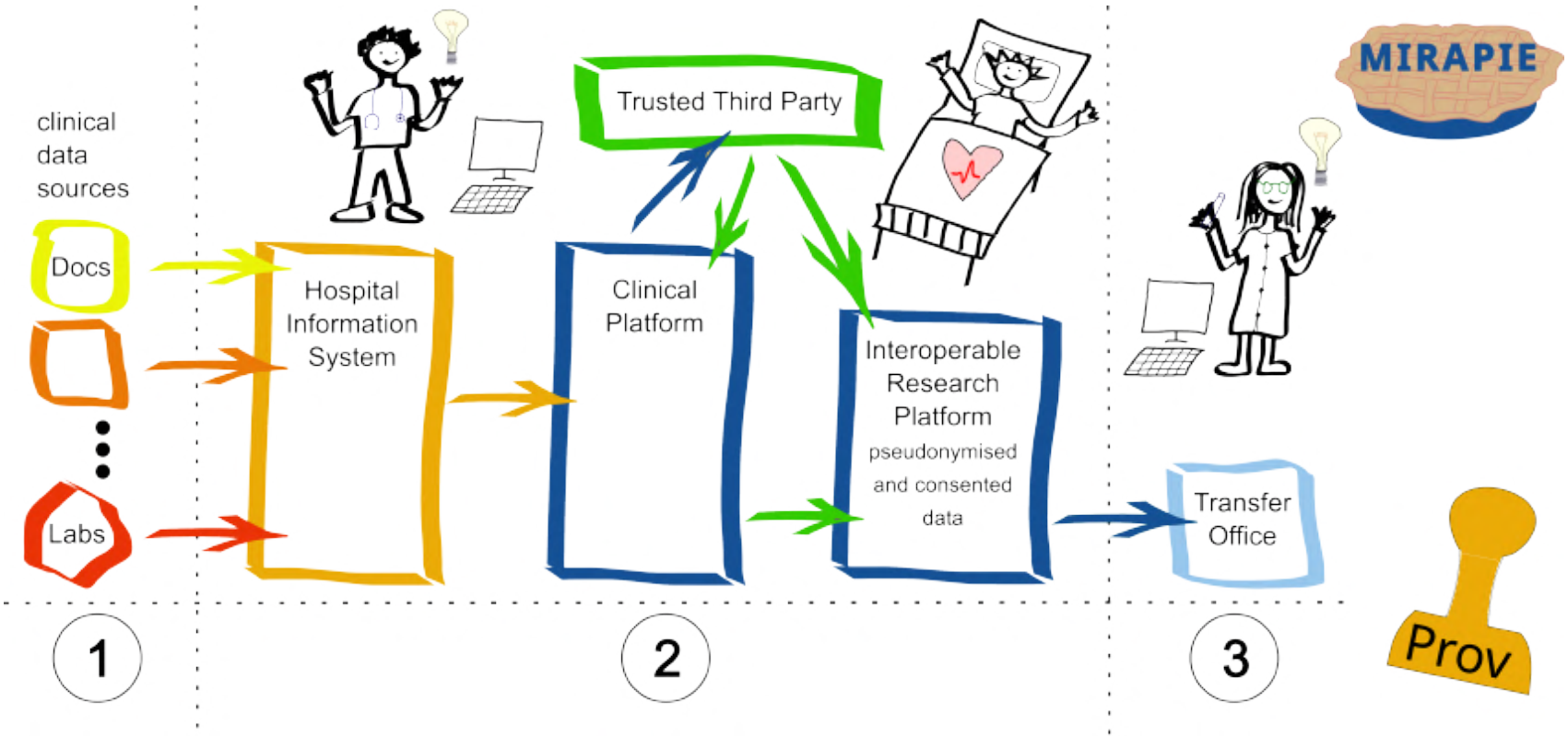
Provenance standardisation efforts



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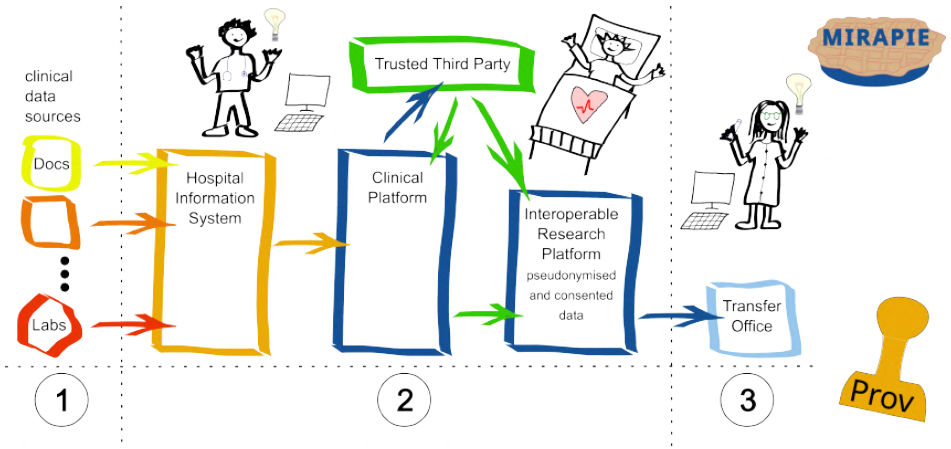

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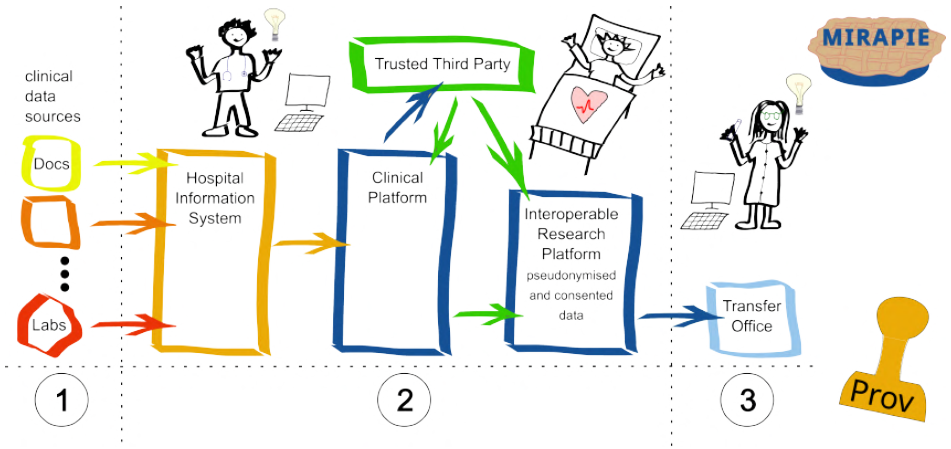

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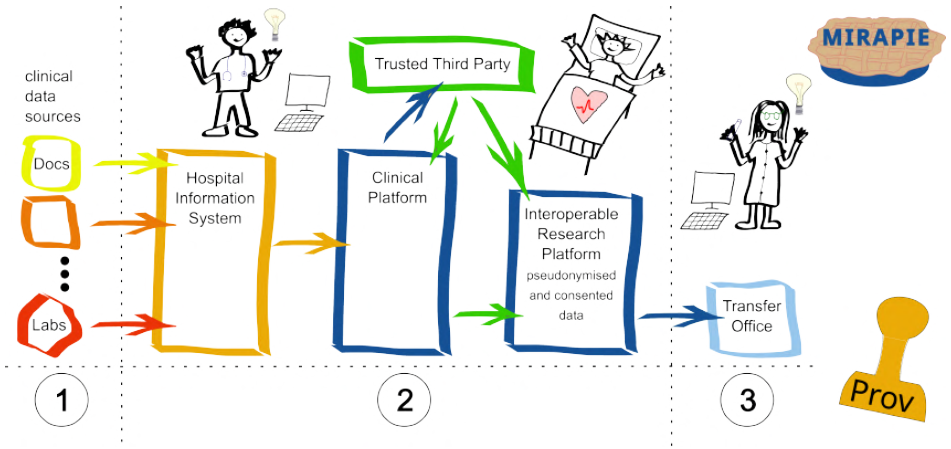

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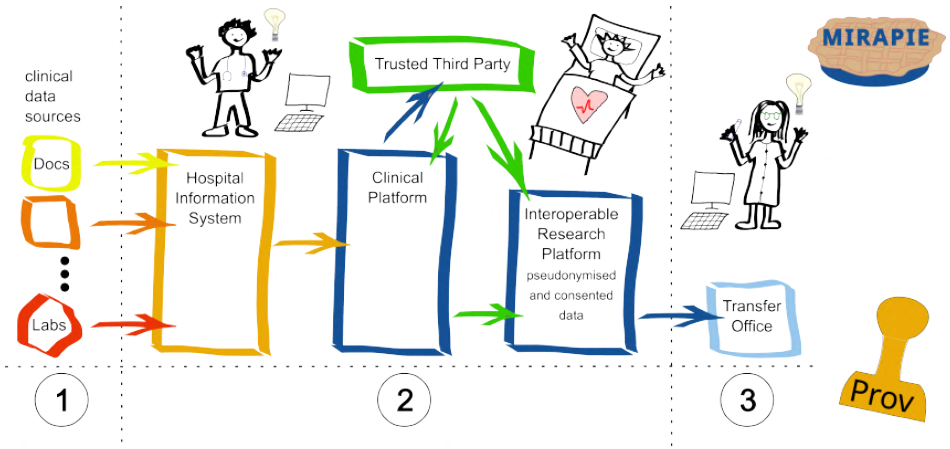

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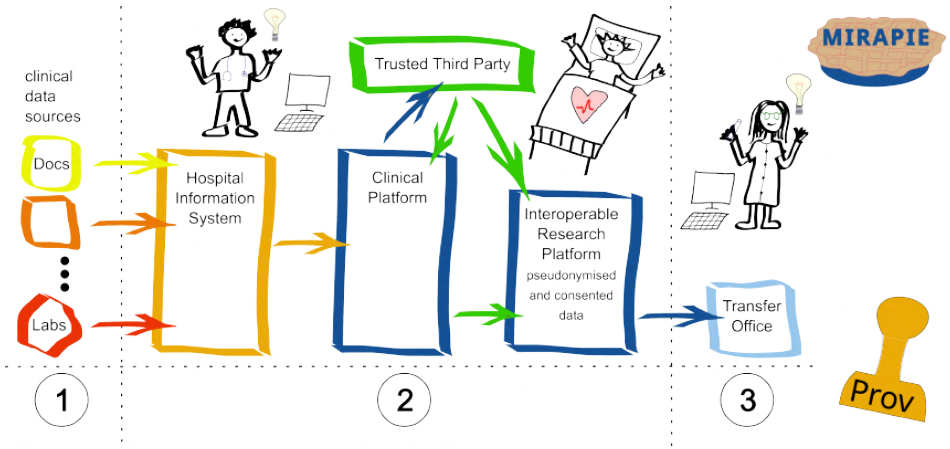

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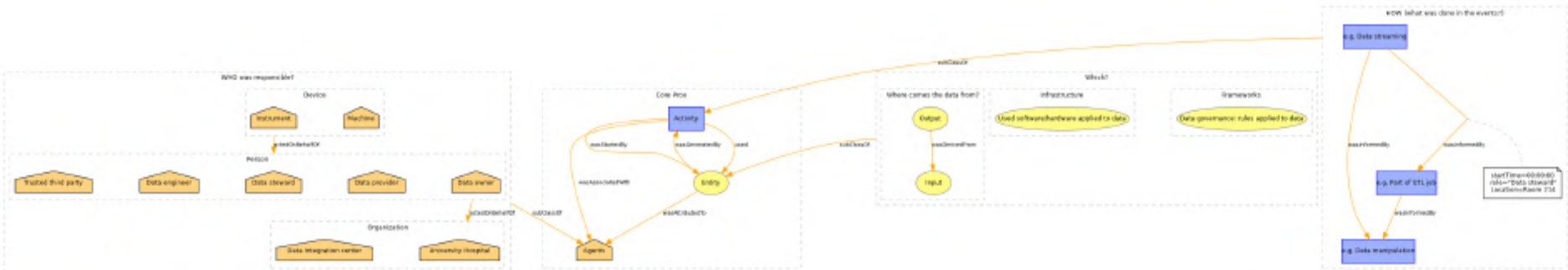

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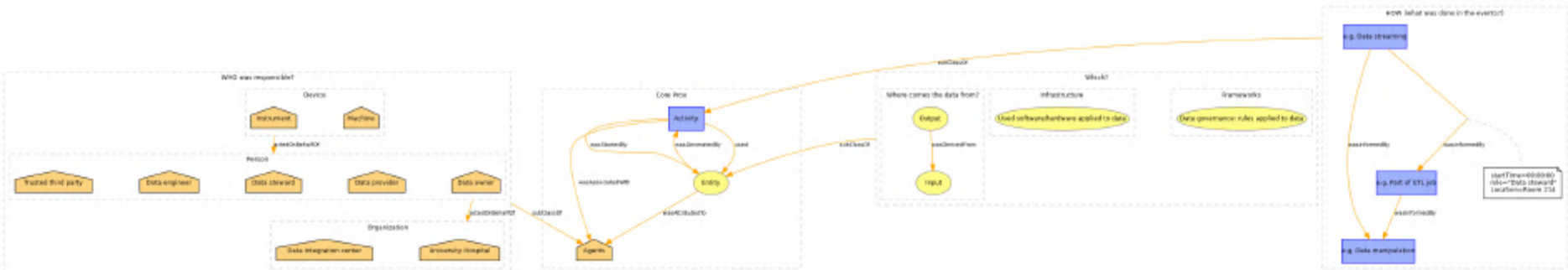

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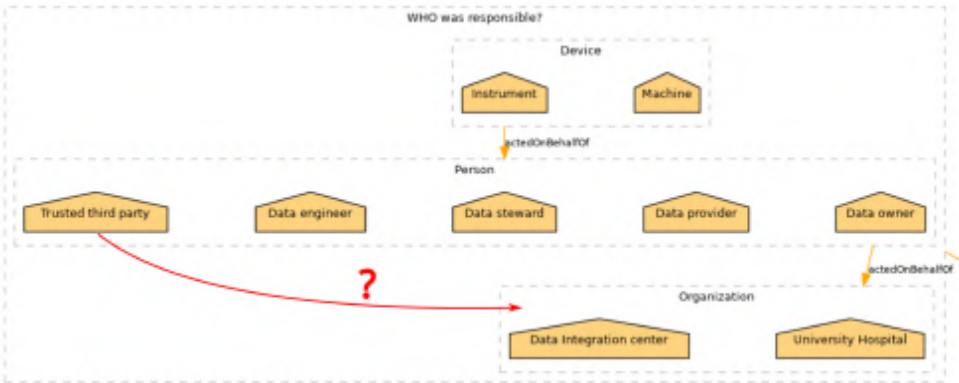

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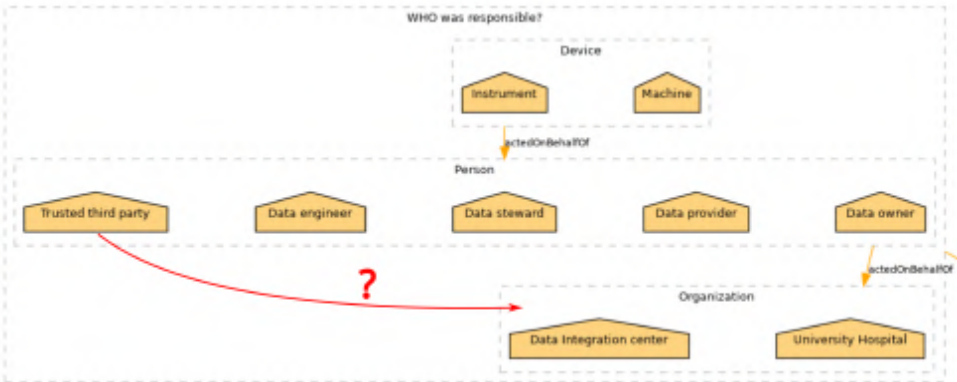

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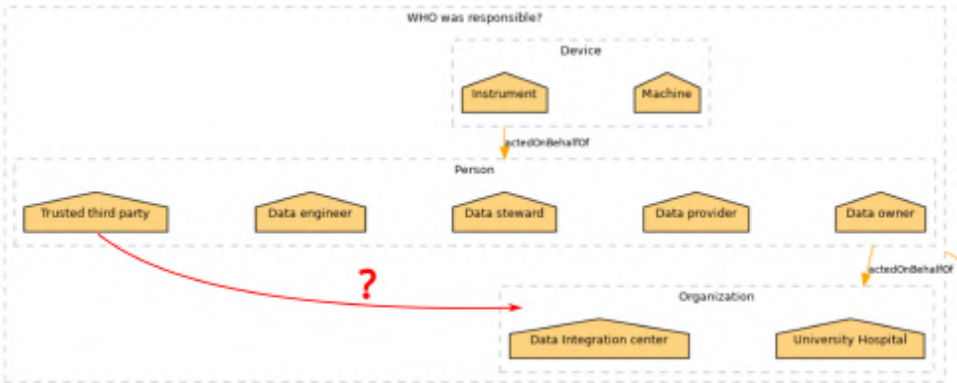

Community engagement: BioCypher + BRO

- BC repo: https://github.com/biocypher/biocypher

credits: Sebastian Lobentanzer, 

, and Julio Saez-Rodriguez

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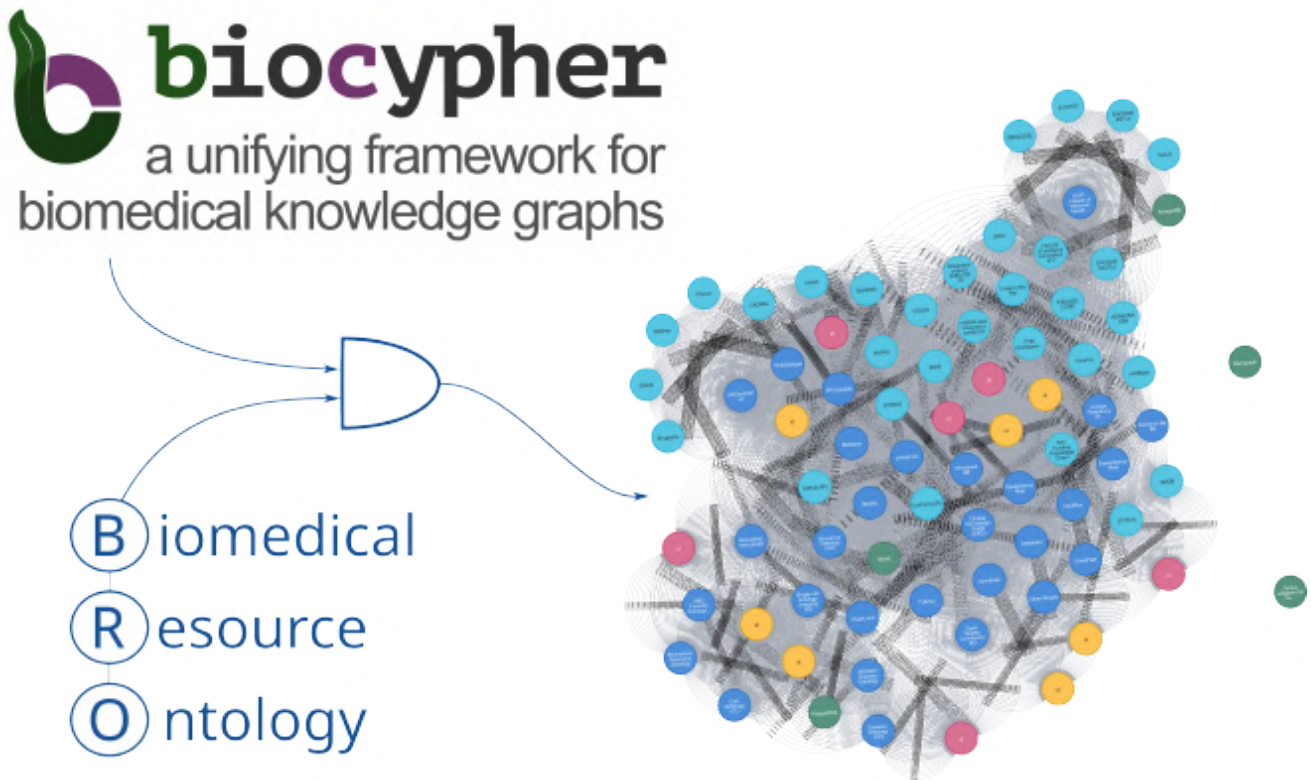

- BC repo: https://github.com/biocypher/biocypher
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- meta-graph repo: https://github.com/biocypher/meta-graph

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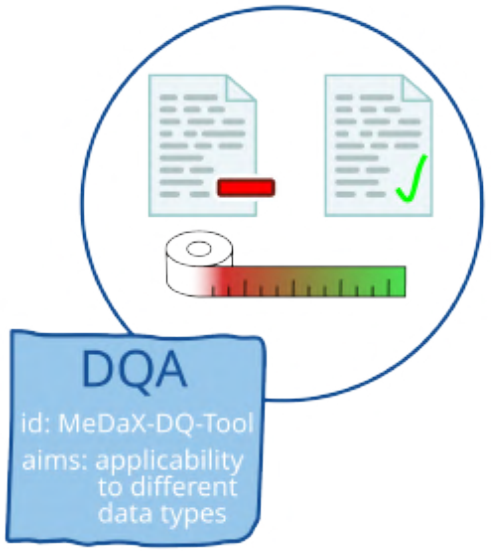
- cleaning up, removing redundancies, refining definitions, etc.

Cooperation on Data quality (DQ) measures



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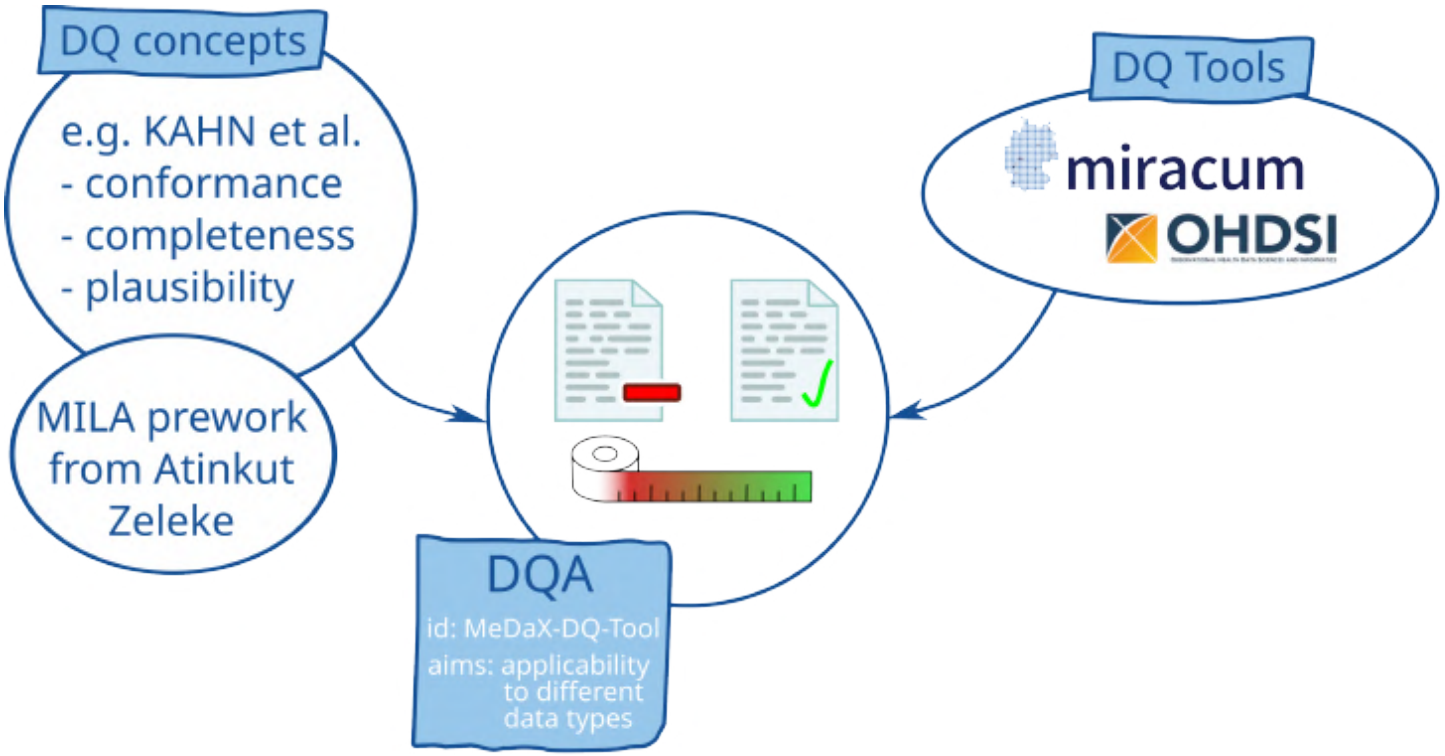

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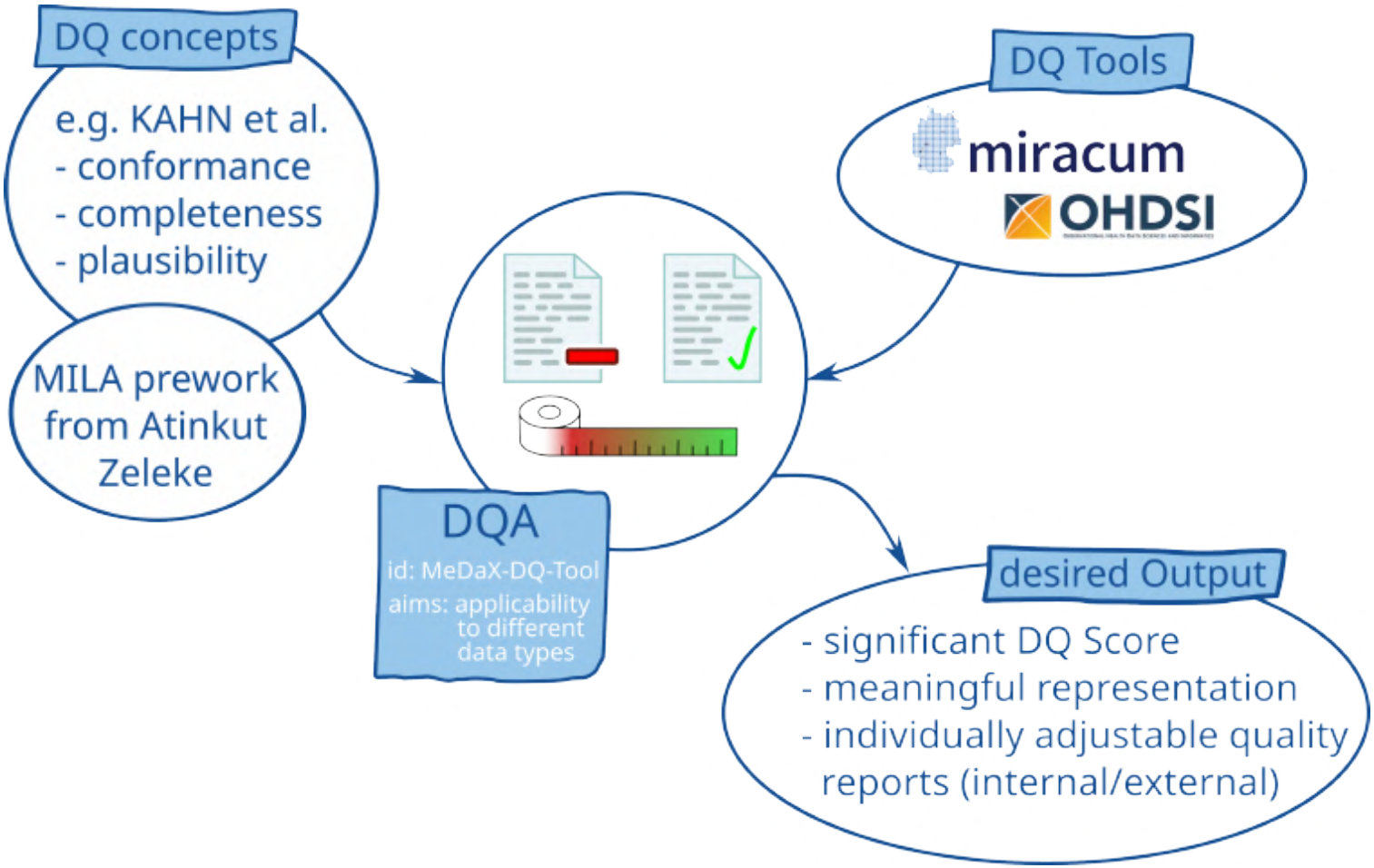

FAIR Impact: a FAIR assessment of the MII CDS

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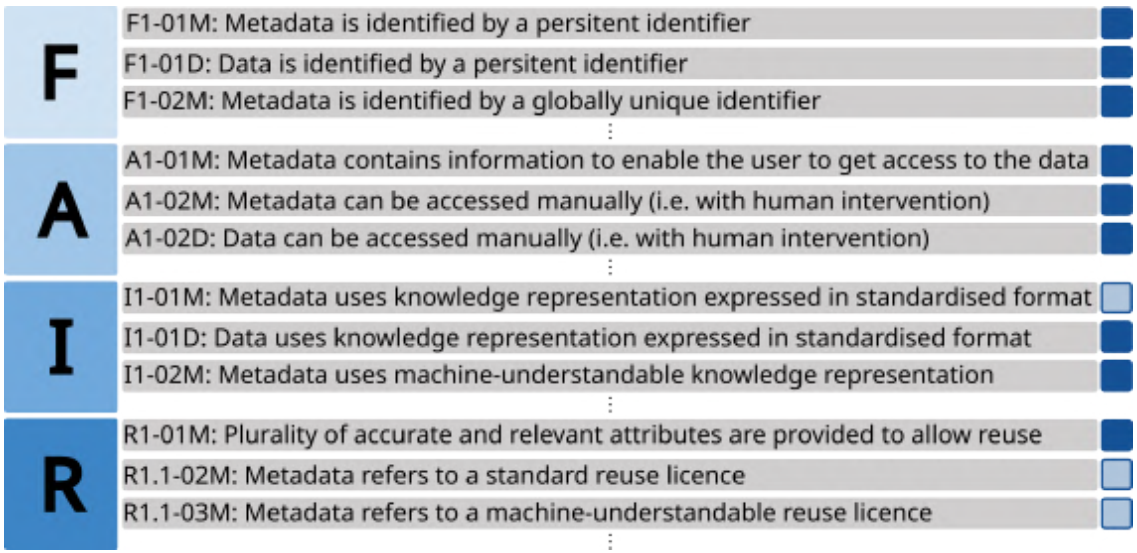

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The MeDaX-KG v0.2 (prototype)

Step 1: FHIR formatted research data is generically converted into a neo4j graph database: reuse CyFHIR

credits: CyFHIR repository: https://github.com/Optum/CyFHIR/

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FHIR example: patient

CyFHIR data model: patient

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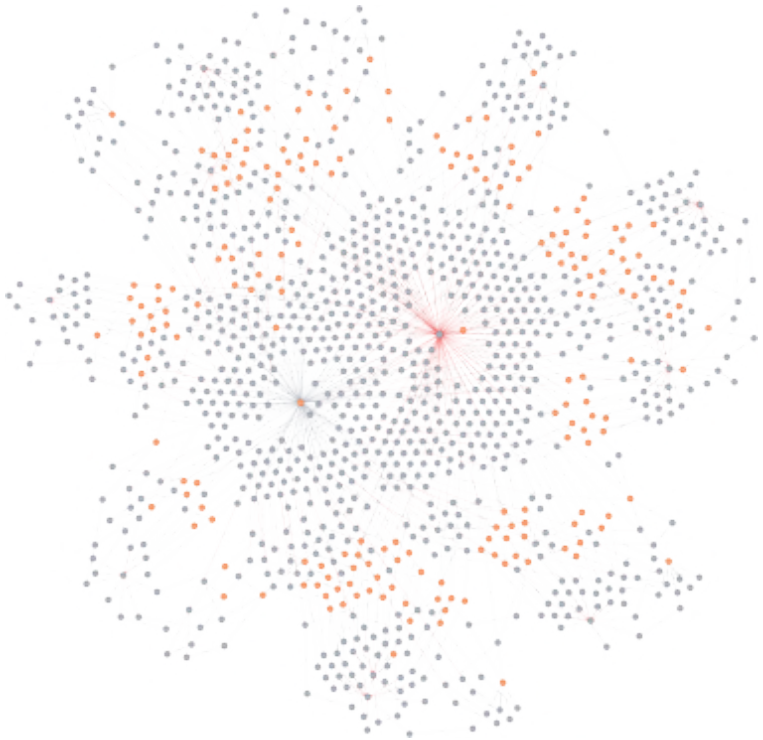

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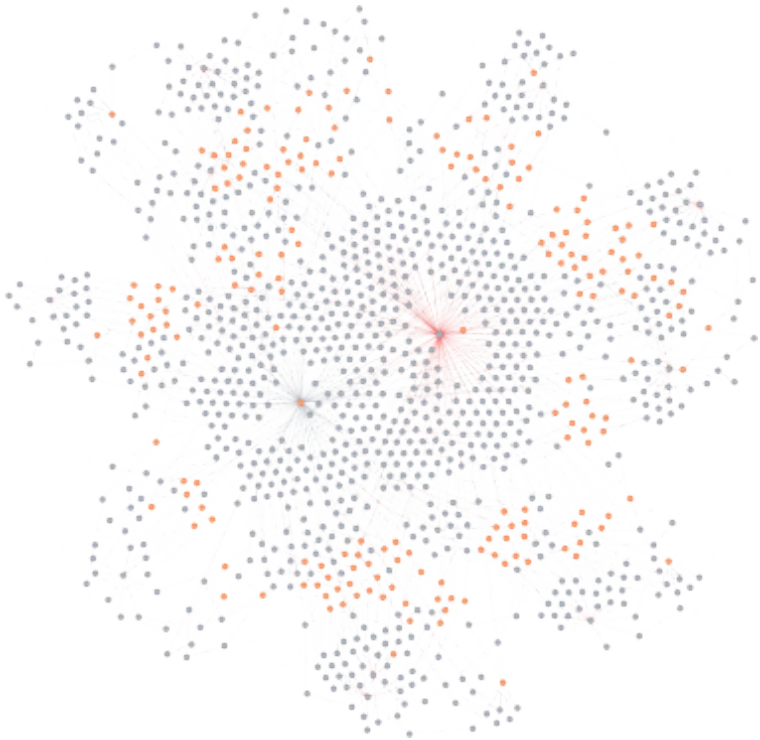

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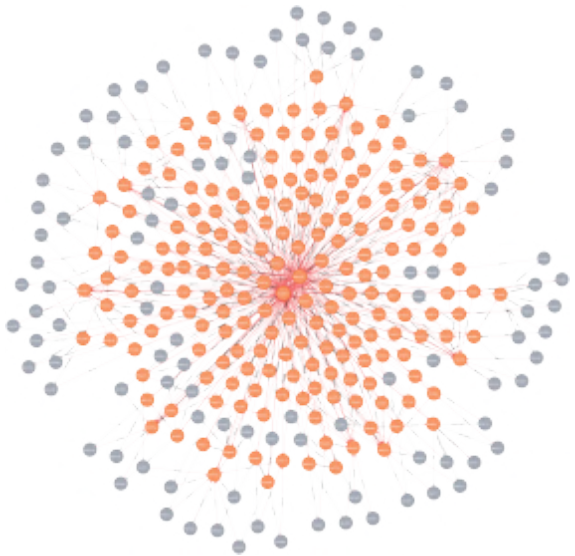

post-processed graph

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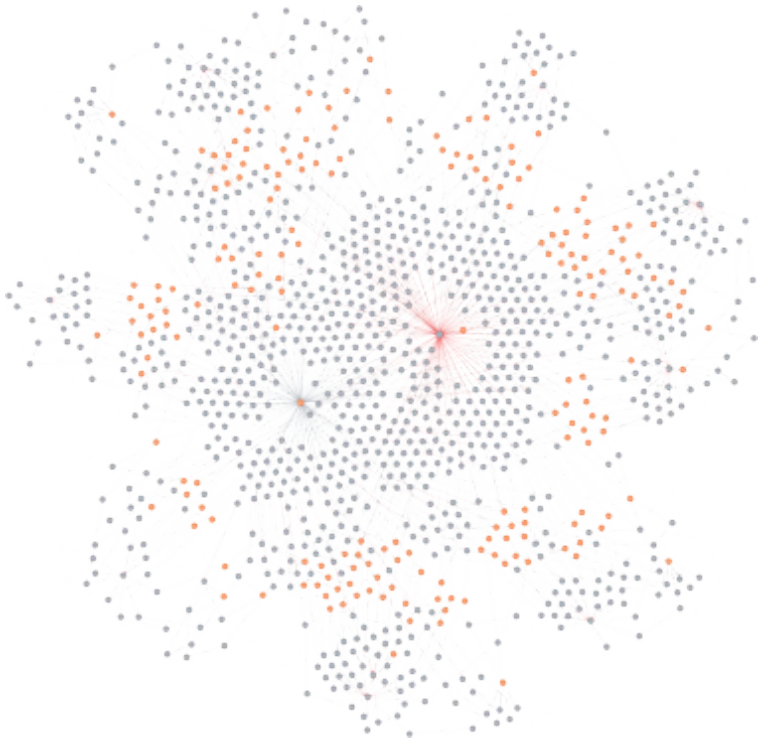
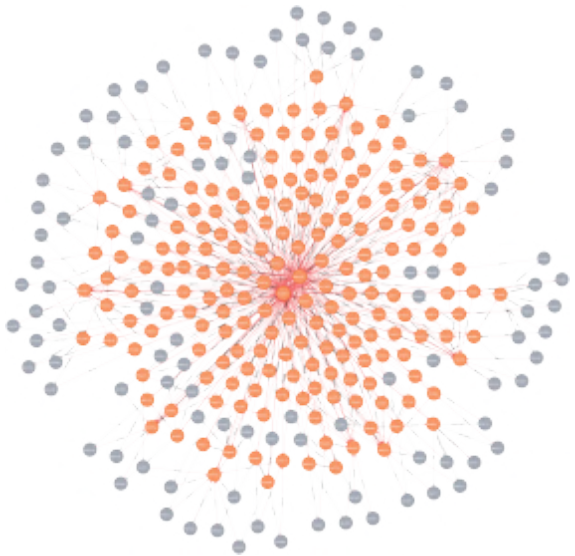


generic graph → Neo4j

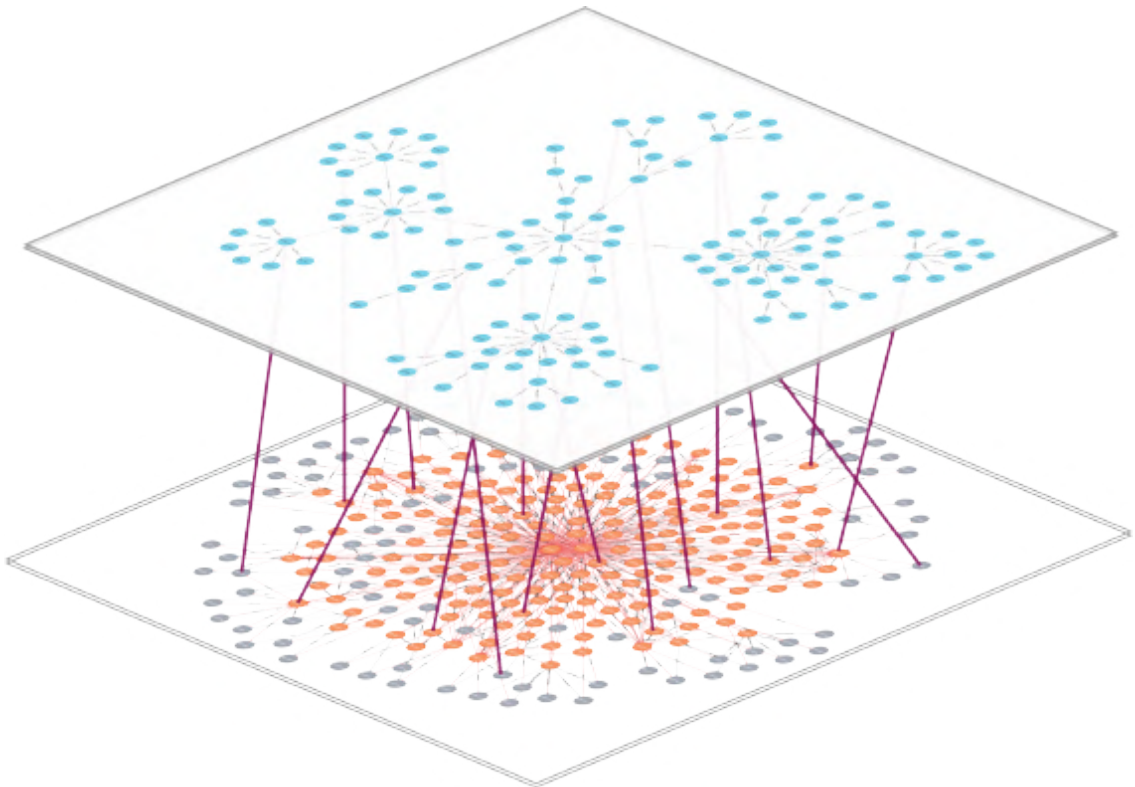


post-processed graph

credits: Ilya Mazein

The MeDaX-KG v0.2 (prototype)

Step 3: Integration of BioLink data model: BioCypher



credits: Ilya Mazein and Tom Gebhardt

The BC-MeDaX-KG prototype - WIP

- MeDaX-KG + common data model (BioLink + BRO)

credits: Sarah Braun, Tom Gebhardt, Ilya Mazein, Lea Michaelis, Ron Henkel

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- granularity optimisation (germany-specific test data would be nice!)
- automatic inclusion of new nodes and relations to BC input yaml file based on source data
- cleaning up repo, code, documentation

credits: Sarah Braun, Tom Gebhardt, Ilya Mazein, Lea Michaelis, Ron Henkel

Data protection in biomedicine

- **in biomedicine we are working with the data of people**

credits: Benjamin Winter

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- user access control is sovereignty of the DICs

credits: Benjamin Winter

Outlook

- publish our results

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- test our MeDaX pipeline in UMGreifswald productive DIC environment

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- integrate further data sources into our MeDaX-KG (new law in M-V upcoming: complete HIS data is potential input)

What is MeDaX?

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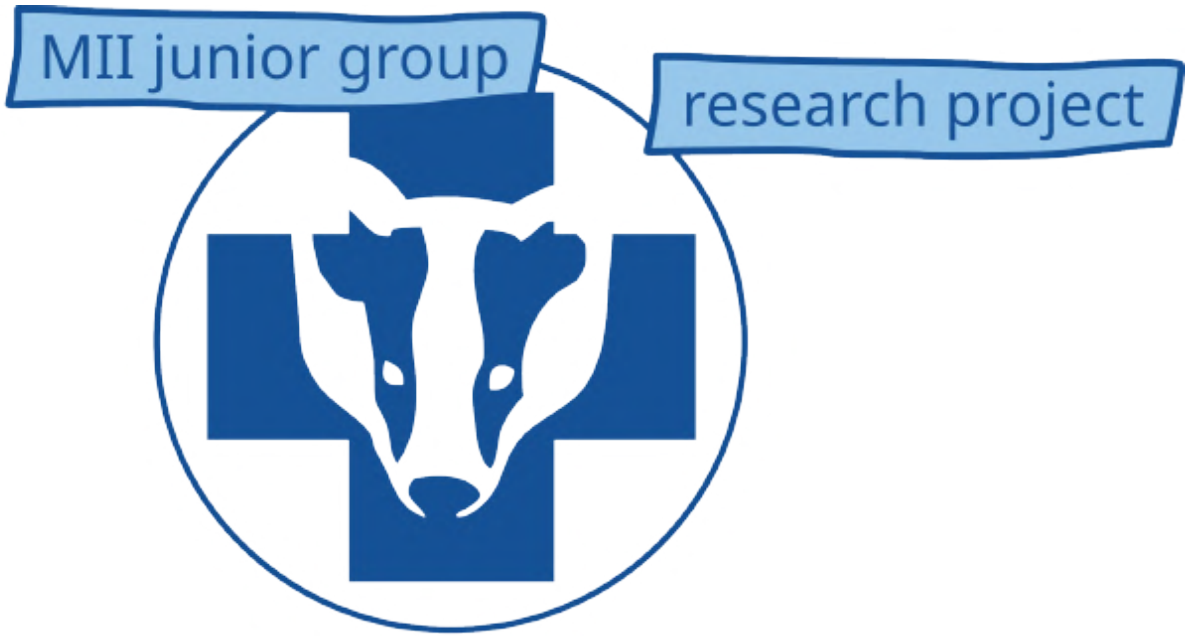
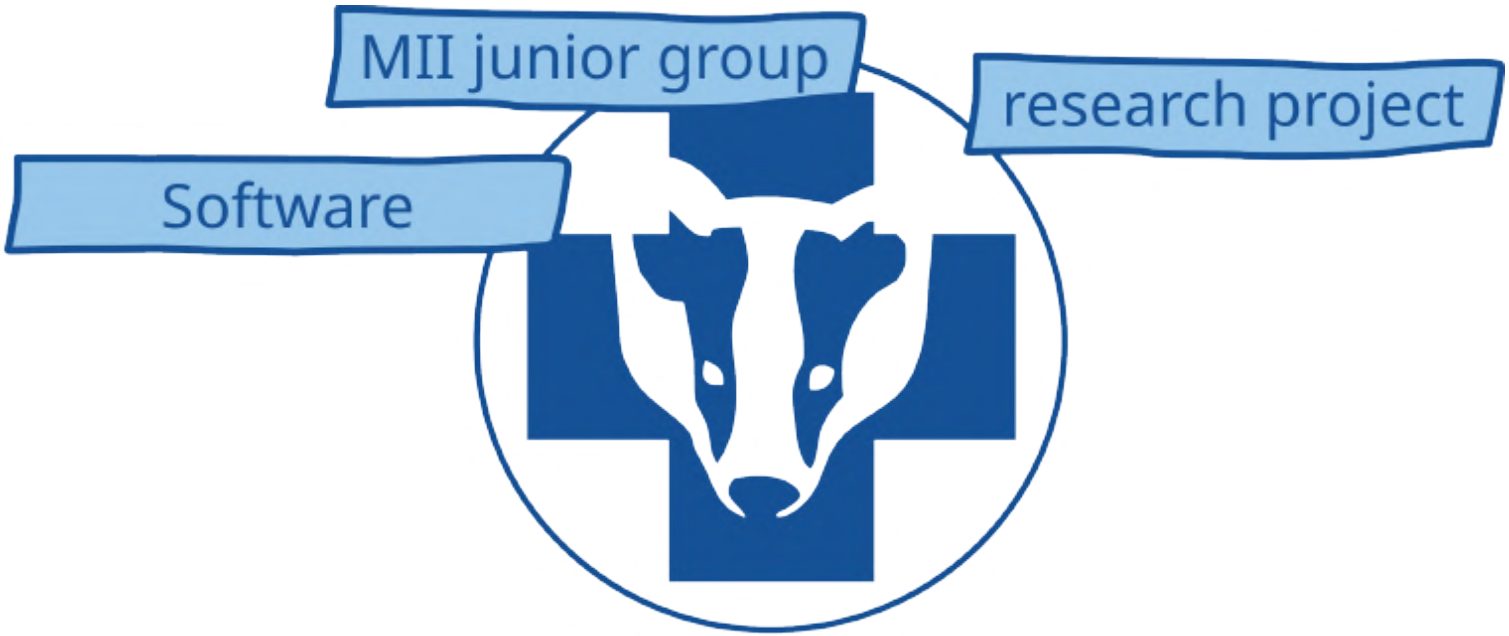


What is MeDaX?



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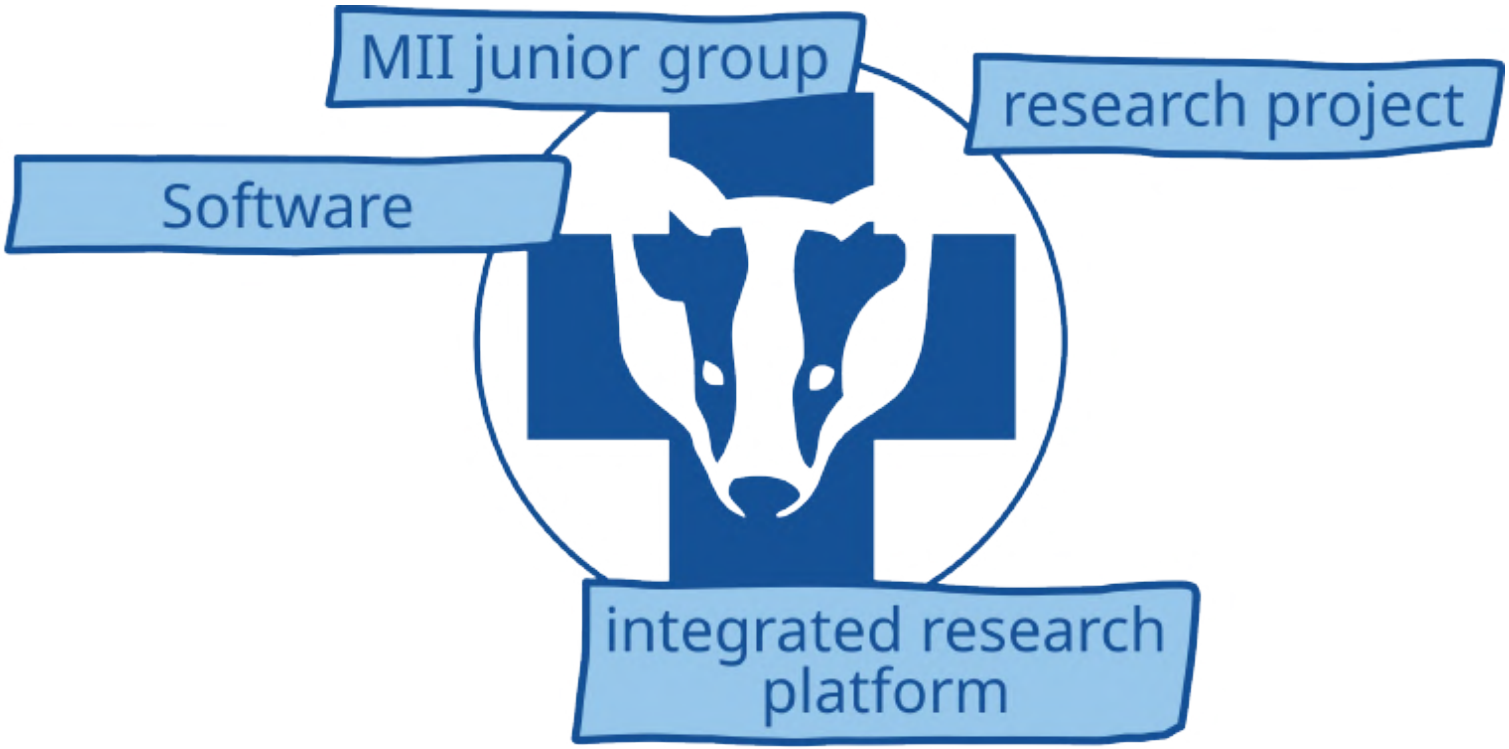

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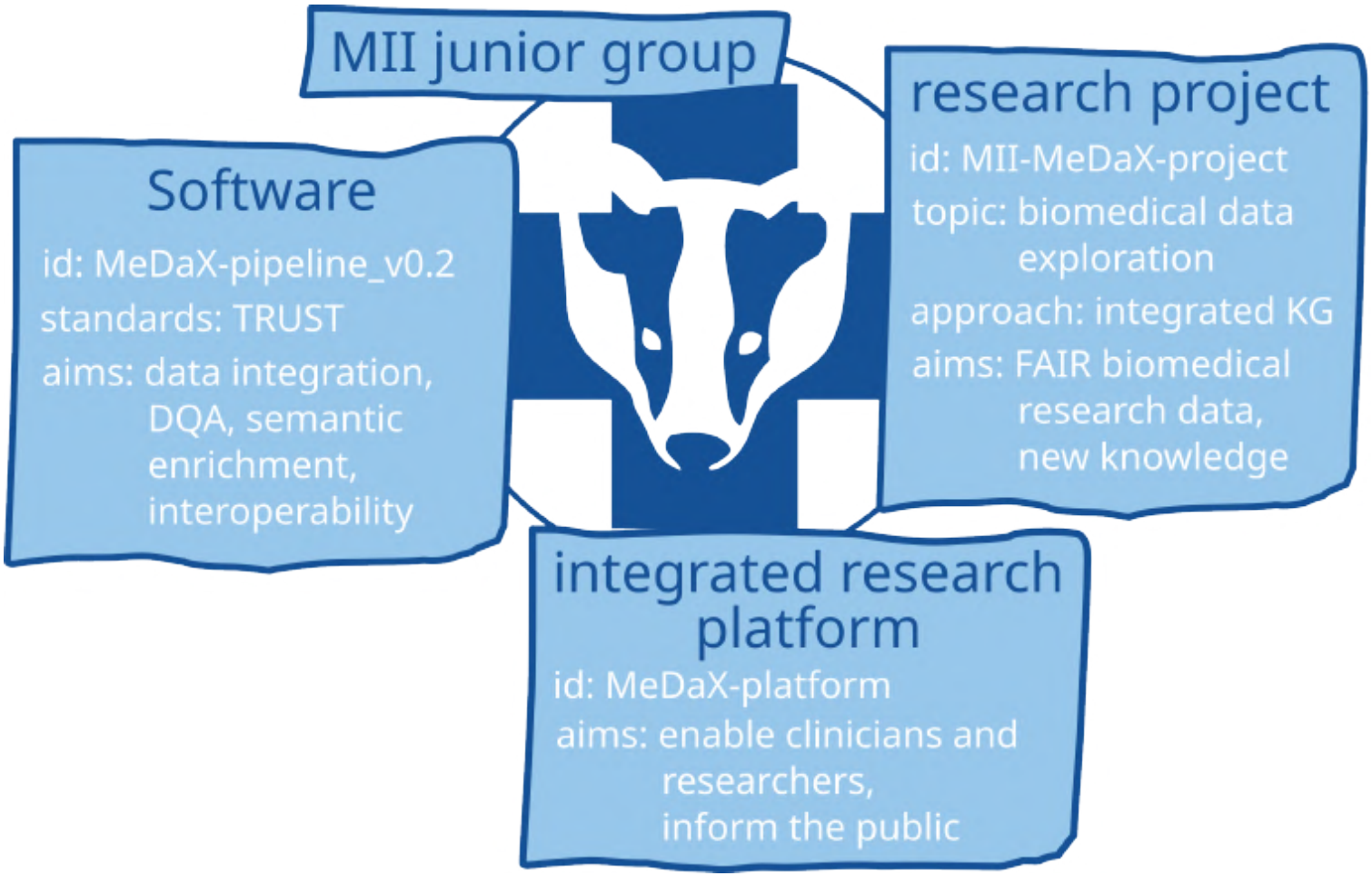
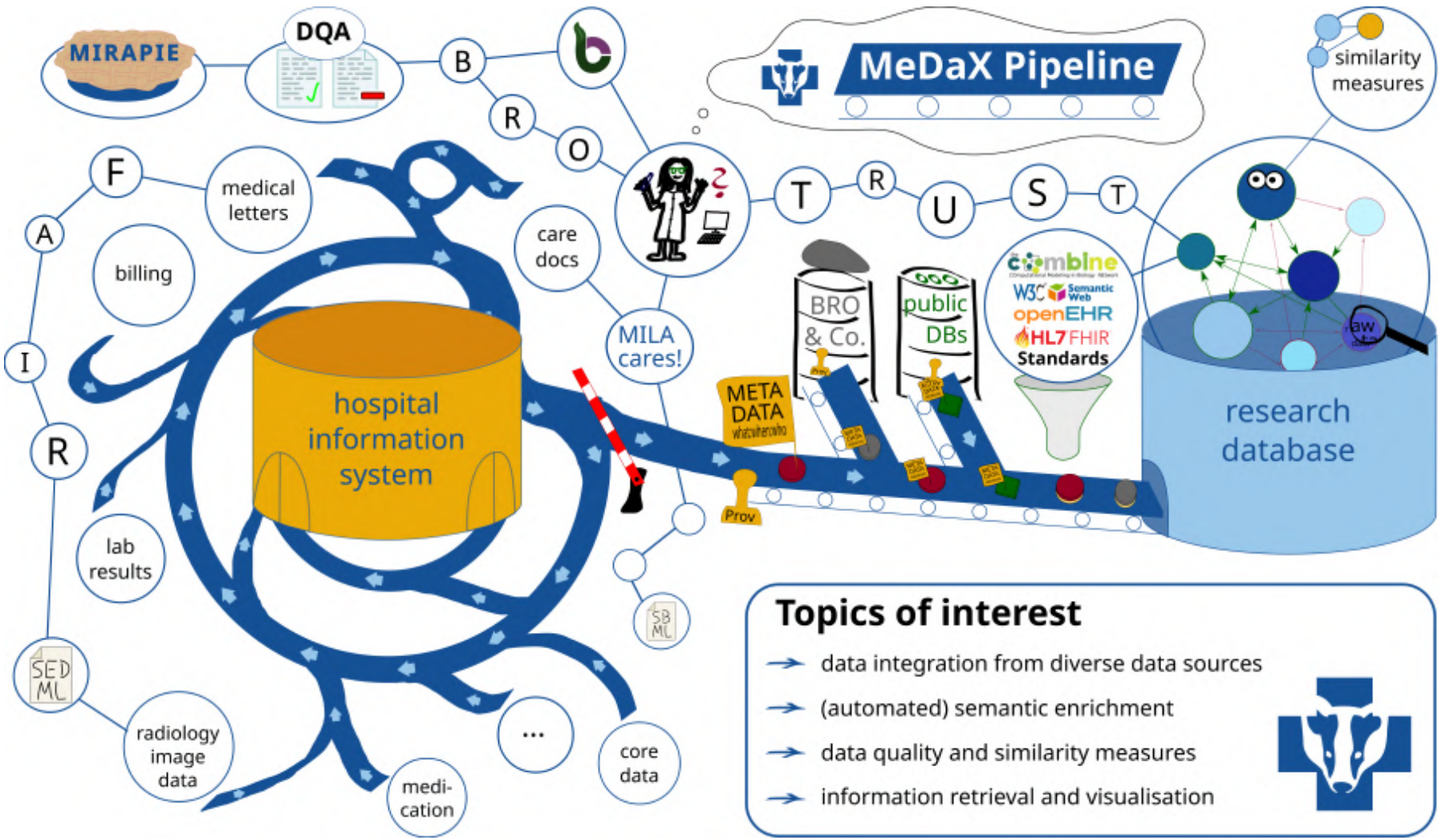


MeDaX-Wimmelbild



The MeDaX-Team

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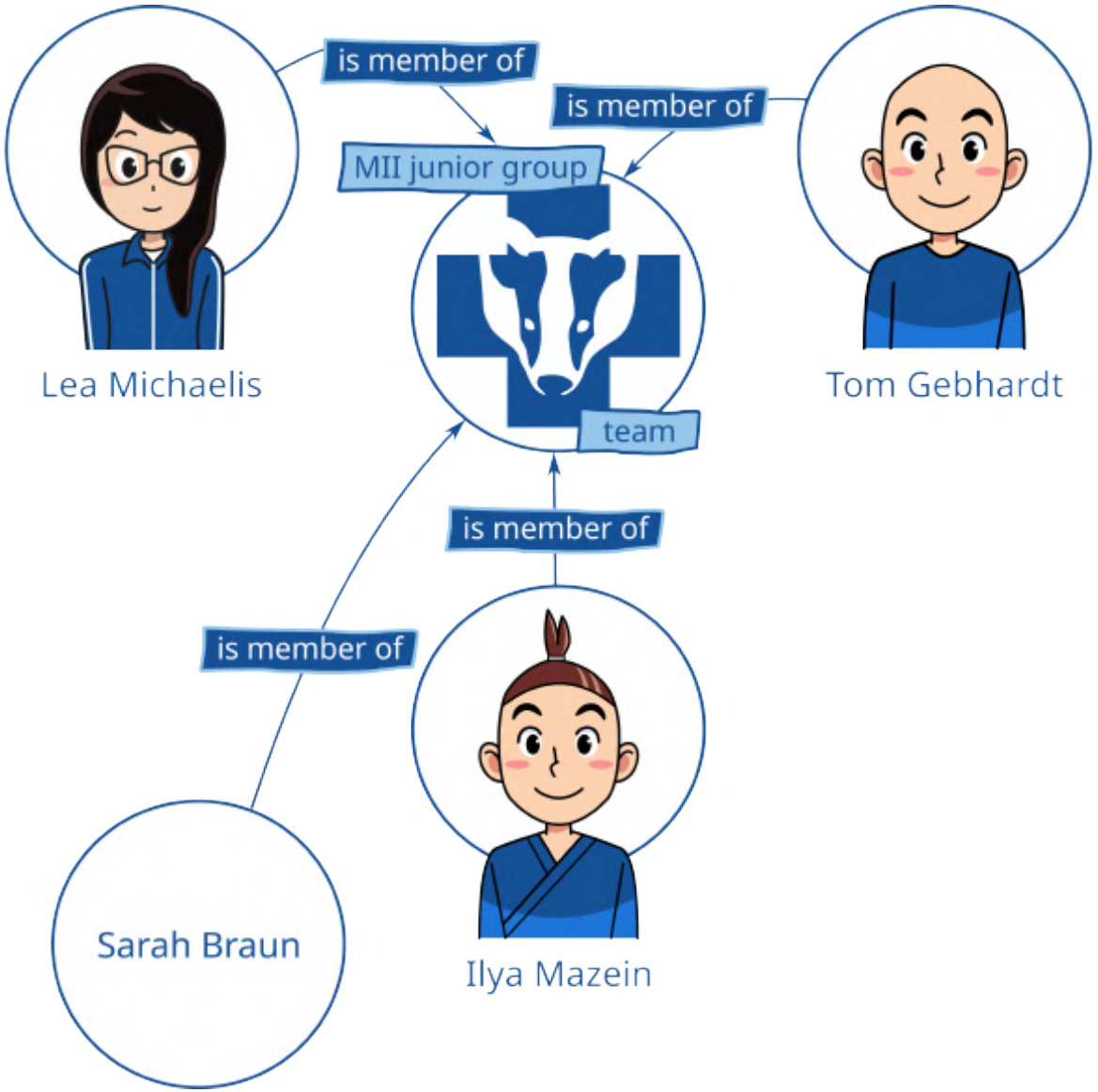
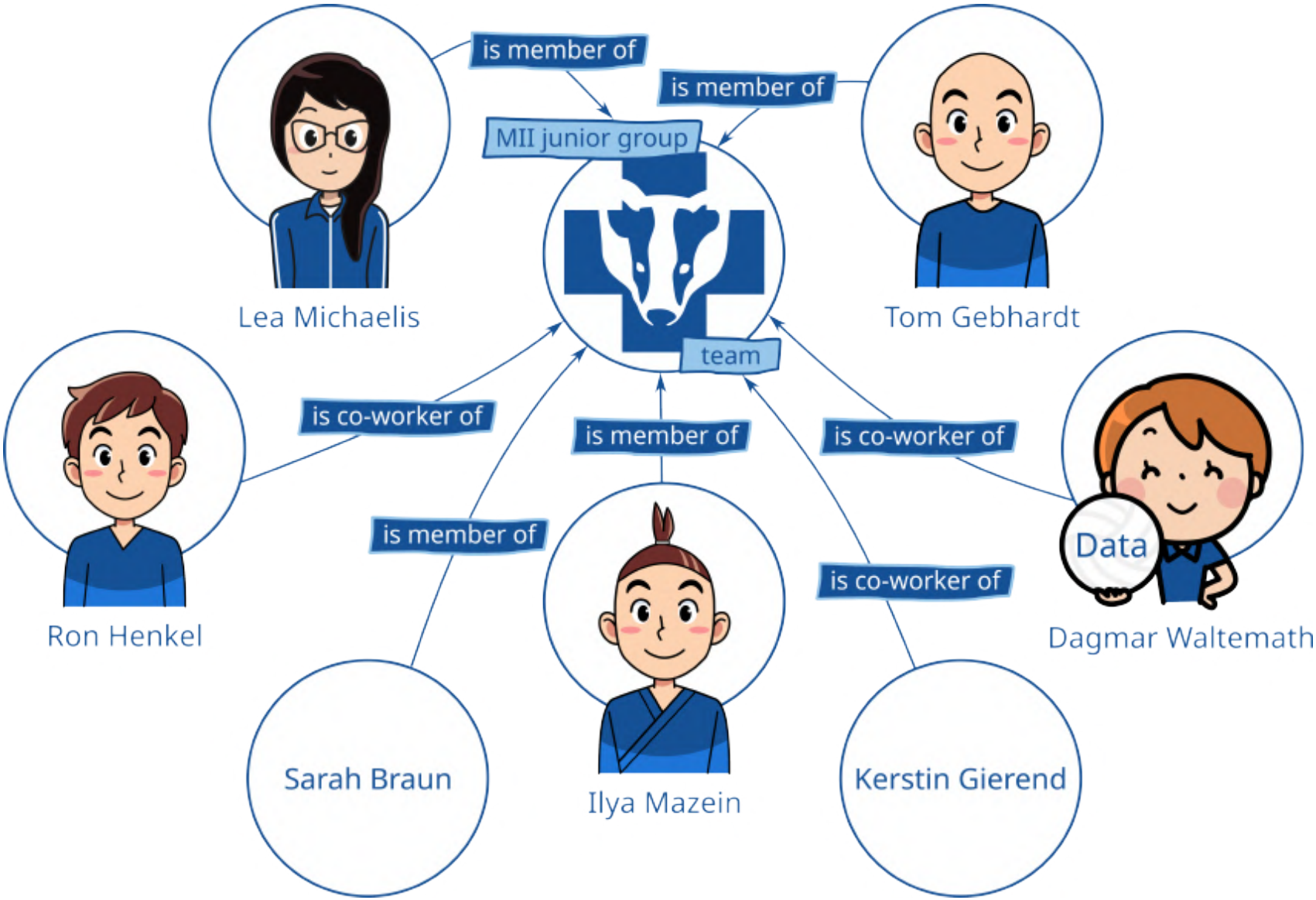


Personalised avatars by Tom Gebhardt, originals by oksmith found at openclipart.org

The MeDaX-Team



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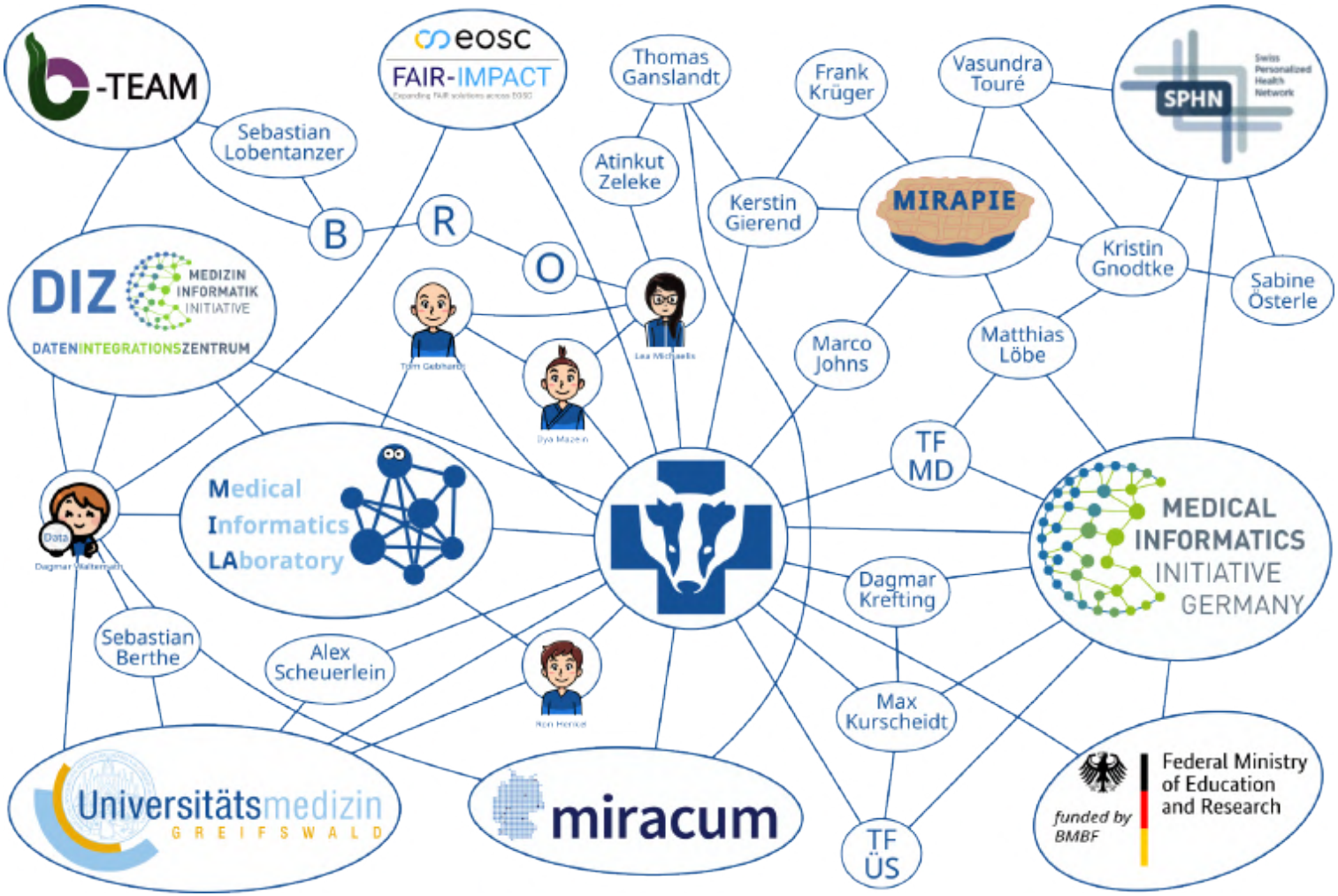

Thanks for your attention!

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