Swiss Health MetaData Repository

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Context

- Health Information System (HIS)
  - Goal: generate **information** to improve health management decisions at all levels of the health system
  - Functionalities : **data** collection, **data** processing and reporting.
  - Strengthening HIS : promoting **data integration** through a well-described and coherent set of best practices.

HIS design needs to favor flexibility

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Data Management

Data integration infrastructure:

- Centralized approach: all relevant data collected in a central location
  - Data Warehouse - uniform data model
  - Data Lake - no single data model
- Decentralized approach: accessing data at their original location
  - Federated database accessed using Web Services

Choosing best approach for Swiss health Information system by considering technical, legal, cultural and political implications

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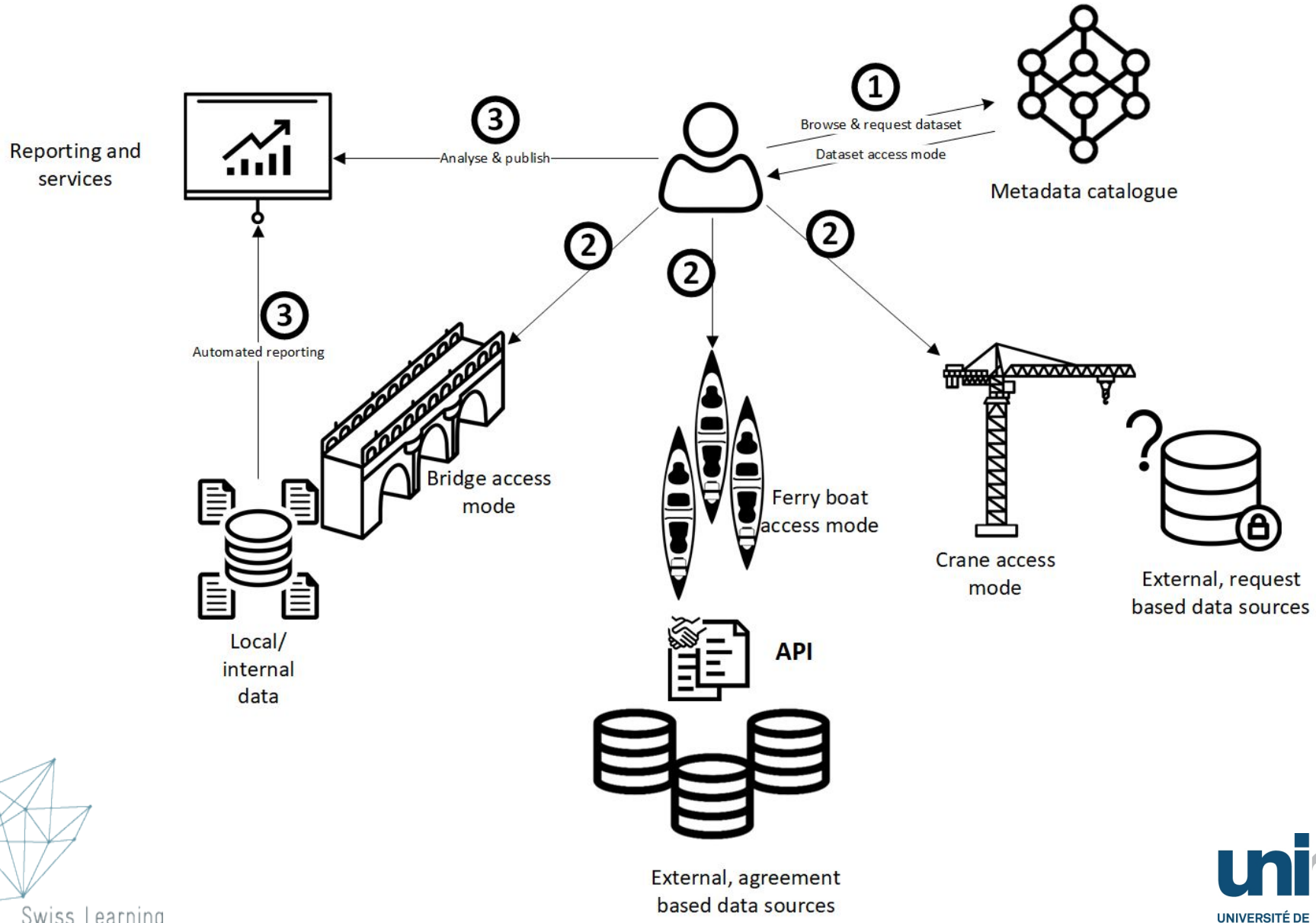
Hybrid infrastructure



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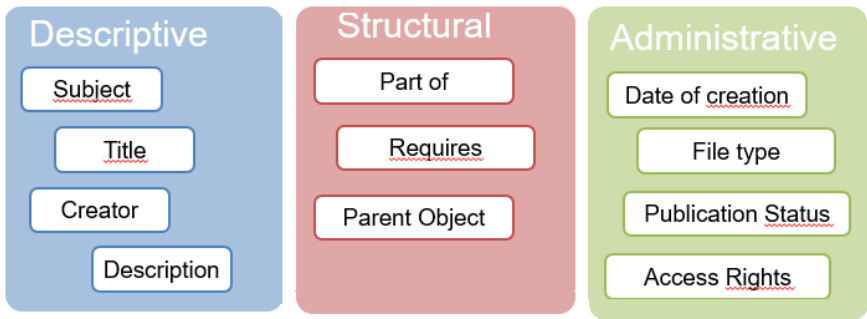
MetaData Repository

- Hybrid approach - necessity to have information (**metadata**) about data sources
- Metadata : a structured set of information used to describe a resource



- A central metadata repository - main element of the metadata management infrastructure

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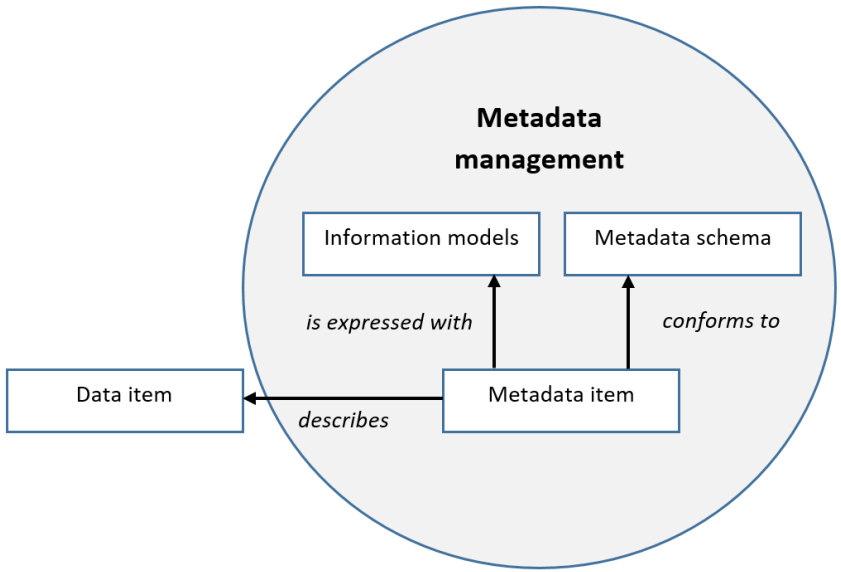
Metadata management

- Metadata schema - provides consistency for description of digital resources (How)
- Information models - provides consistency for the meaning of description terms (What)
  - Syntax encoding scheme
  - Semantic (vocabulary) encoding scheme
- Metadata management - process of using metadata schema and information models in order to structure metadata items related to data
  - guarantees that the needed data are retrieved and accessed from the right databases and respecting each dataset specificities



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Metadata management

- Generic description metadata schema - Dublin Core
  - Core set of metadata elements : *Creator, Format, Date, Rights, Subject, Identifier, Language, etc.*
  - Rules and recommendation
    - Syntax encoding schema for date and time
    - Universal Resource Identifier (URI)
- Information models - abstract description expressing the meaning of items, formalized as:
  - *Nomenclatures* - a set of rules used for forming the names/terms
  - *Classifications* - concept of classes, with exhaustiveness and mutual exclusiveness
  - *Terminologies* - vocabulary of terms, including preferred terms, synonyms, definitions
  - *Taxonomies* - hierarchical representation using super and sub - concepts
  - *Ontologies* - domain representation, based on logically defined formalism, and using concepts, properties, relationships, instances or axioms as building blocks.

Health information models (HIM)

- Health information models
  - SNOMED / SNOMED CT (ontology)
    - Role/Domain : Lab results, Decision support for specialists in infectious diseases
  - LOINC (terminology)
    - Role/Domain : Laboratories
  - ICD11, ICF, ICHI (classifications/ontologies)
    - Role/Domain : Medico-economics, Post-market surveillance, Epidemiology
  - WHO-ATC (classification)
    - Role/Domain : Post-market surveillance
  - medDRA (terminology)
    - Role/Domain : Clinical trials, Post-market surveillance
  - openEHR (terminology)
    - Role/Domain : Management, retrieval and exchange of health data in electronic health records
- Some criteria for optimal HIM
  - Patient-centred care ontology basis
  - Technology neutral model semantic
  - International use
  - Available in Swiss official languages

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Design principles of a central metadata repository as a key element of an integrated health information system

- Policy Brief (review phase)
- Stakeholders Dialog (in preparation)
  - Potential participants: data providers, policy makers, health researchers, developers
  - October - November 2019
- Prototype implementation (autumn 2020)

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Metadata repository prototype

- Implementation of a prototype for Swiss Health Ontological Supported MetaData Repository for creating, editing, controlling, deploying and finding reusable metadata.
- Components :
  - Back-end:
    - Semantic repository
    - Query translation
    - Semantic search engine
    - Semantic integration
    - Web server
  - Front-end:
    web-based interactive application
    - Browsing interface: browsing, searching, and exporting
    - Input interface: adding, updating and annotating metadata

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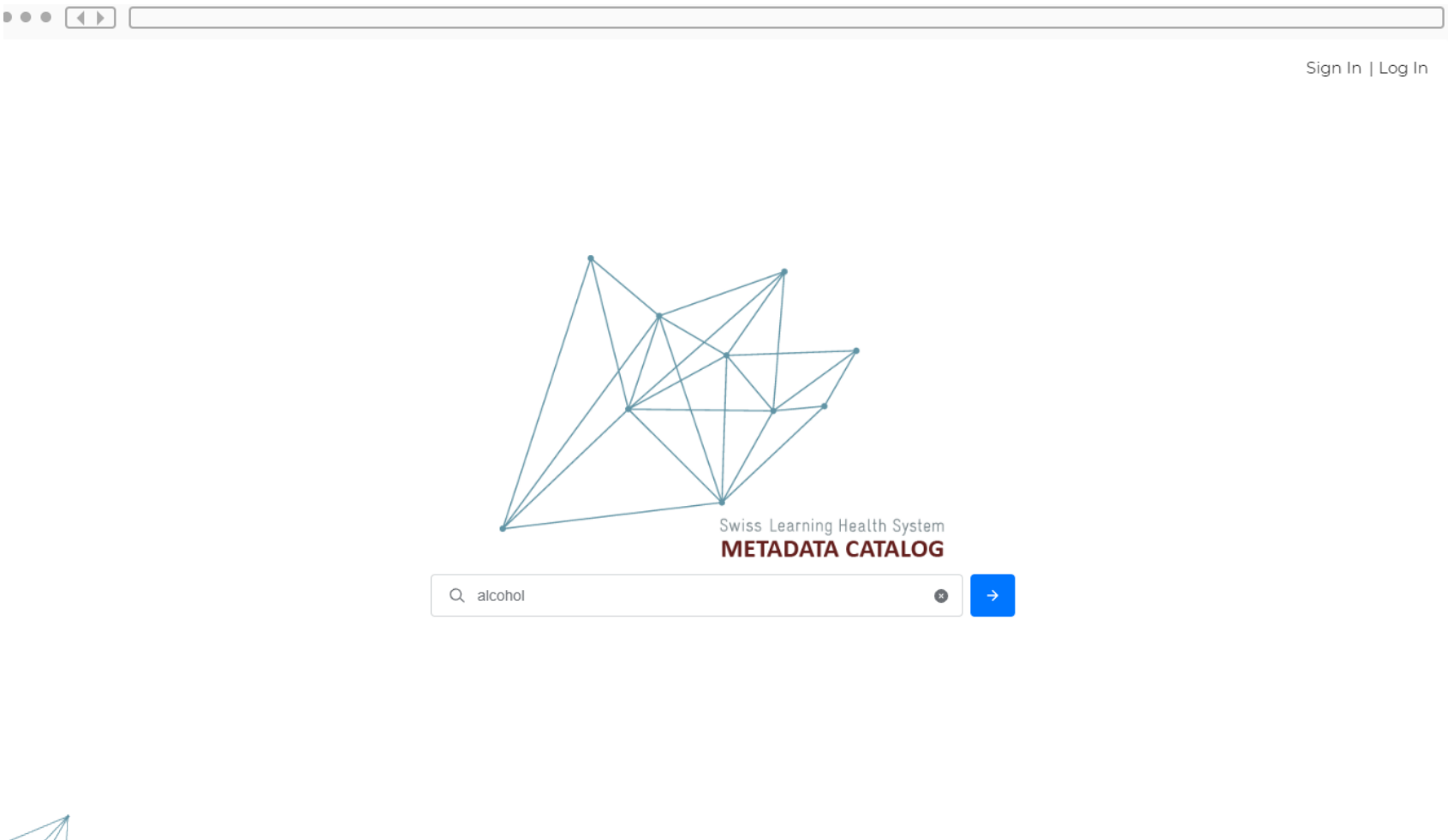
Sneak peek



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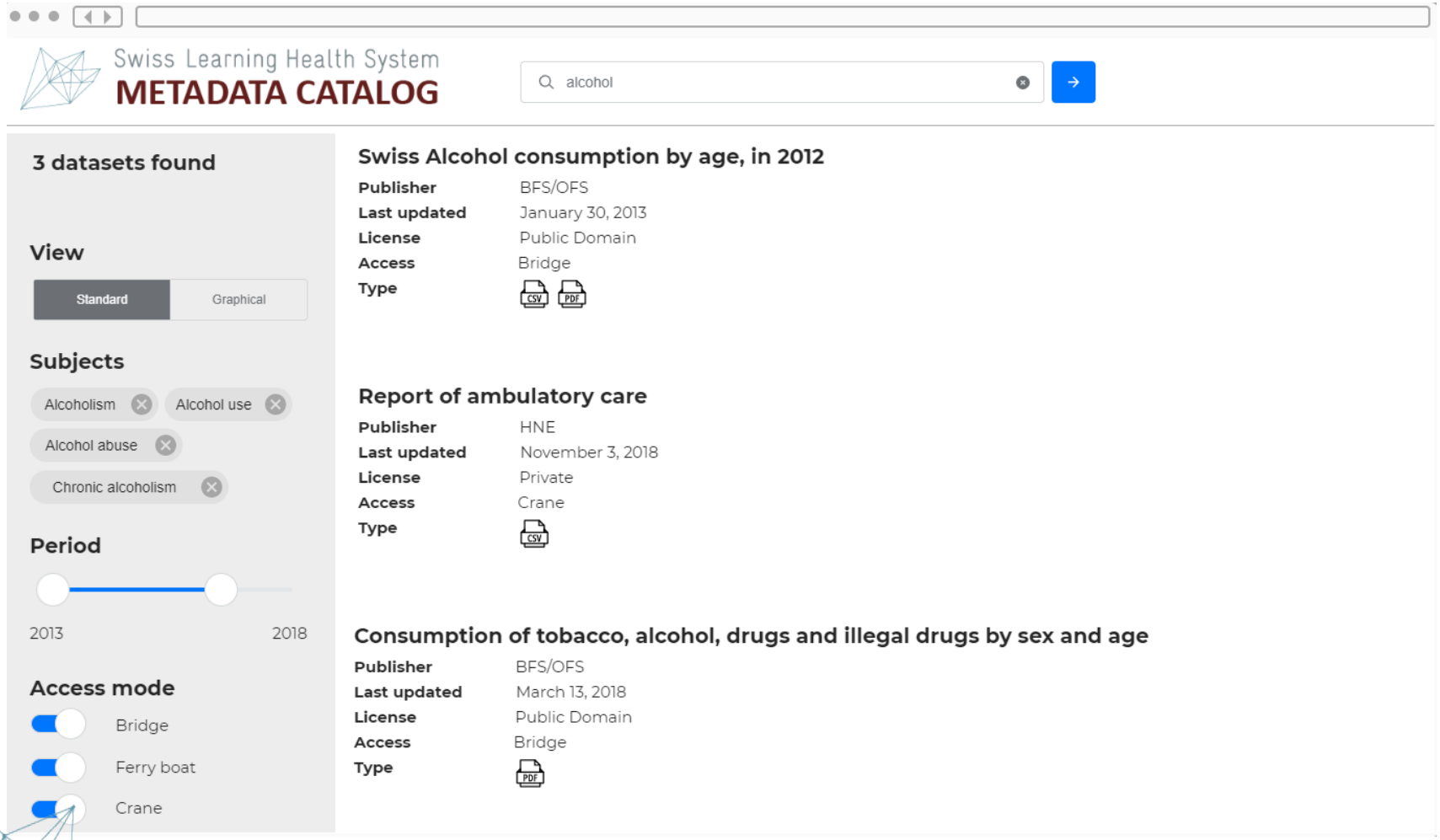
Sneak peek



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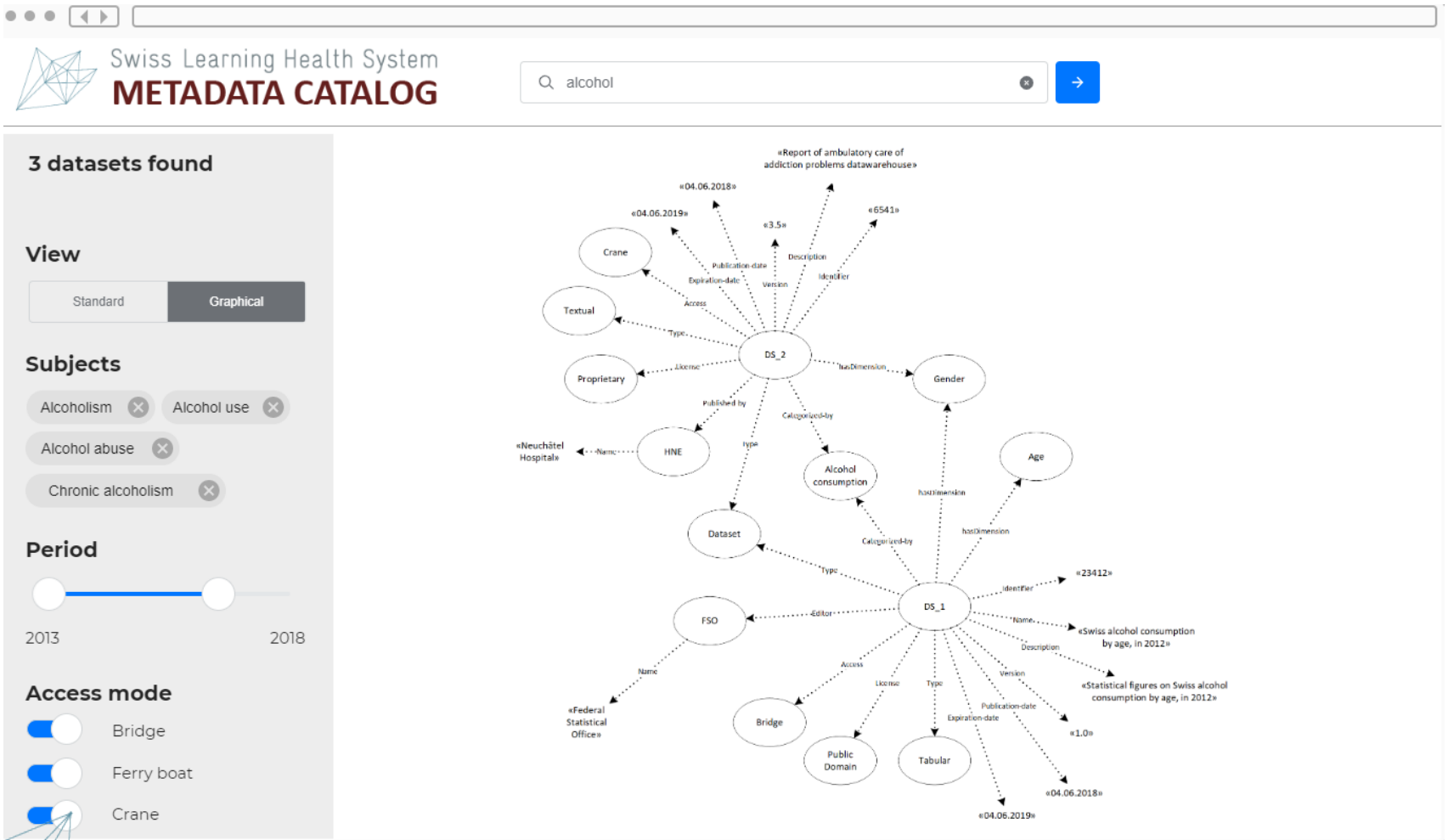
Sneak peek



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Thank you

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