Identifying Content and Levels of Representation in Scientific Data

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Background: the Data Conservancy

The *Data Conservancy*, hosted at Johns Hopkins University Sheridan Libraries, is a multi-institutional project funded under the NSF DataNet program. At the Center for Informatics Research in Science and Scholarship (CIRSS), Graduate School of Library and Information Science, University of Illinois at Urbana Champaign, two Data Conservancy projects are underway. The first, *Data Practices*, is studying the information behavior of scientists around the creation, management, sharing, and use of scientific data. The second group, *Data Concepts*, is developing a conceptual model of fundamental concepts related to scientific datasets.

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5. Balancing local encoding control with standardization for reuse.
6. Understanding what data really is.

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- Descriptions conforming to our model contain information that software tools can use to solve problems.

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Our models use all those things in a theory of what it means to be data, and how we understand different senses of "the same data."

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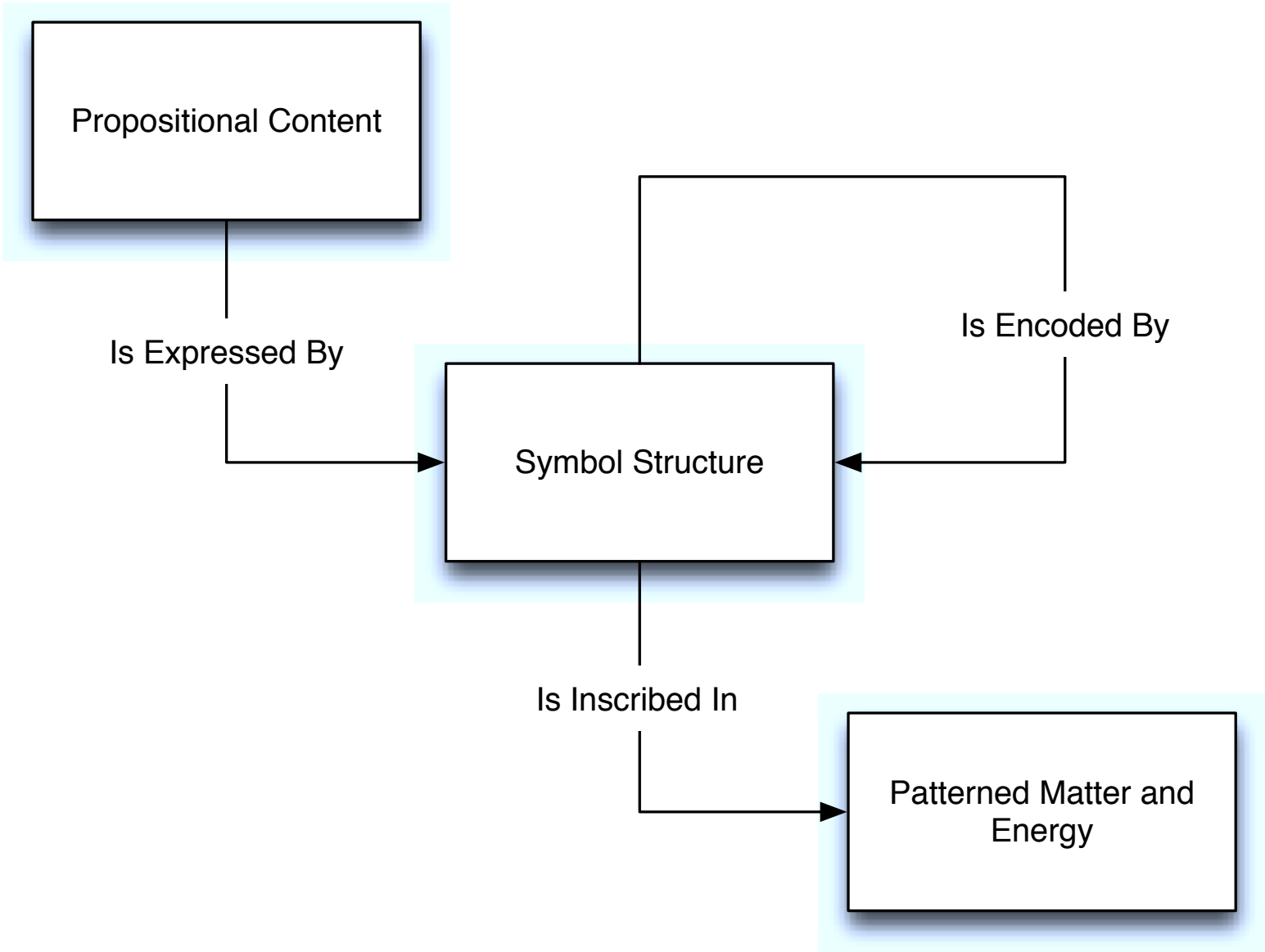
- So these are similar to (but not exactly like) FRBR Group 1 entities.

The Basic Representation Model



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- Observation and computation are two broad superclasses for events in the conduct of science.
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- Systematic assertions appeal for justification to observations or computations.
- Data content are the substance of systematic assertions, and data are their primary expressions.

A DCAM Description as a named graph

```
ex:recordContent a sam:Conjunction ;
    sam:substanceOf ex:kuiRecordAssert ;
    brm:isExpressedBy ex:Desc1 ;

ex:Desc1 = {ex:id1821 a dwc:Occurrence ;
    dwc:minimumDepthInMeters "31" ;
    dwc:year "1965" ;
    dwc:scientificName "Mola mola" ;
    dwc:collectionCode "KUI" ;
    dwc:identifiedBy "Wiley, Martin" ;
    dwc:catalogNumber "32586" ;
    dwc:continent "Atlantic Ocean" ;
    dwc:verbatimEventDate "1/8/65" ;
    dwc:verbatimLatitude "34.1217 N" ;
    dwc:fieldNumber "MLW 34" ;} .
```

SAM-based Metadata

```
ex:kuiRecordAssert a sam:Assertion ;
    sam:hasSubstance ex:recordContent ;
    sam:warrantedBy ex:mlwObserv ;
    sam:hasPrimaryExpression ex:Desc1;
    event:agent "KU Biodiversity Institute" .

ex:mlwObserv a sam:Observation ;
    sam:warrants ex:kuiRecordAssert ;
    event:agent "Wiley, Martin L." ;
    event:time "1965-01-08"^^xsd:date .
```

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- What's important is the information captured and how one understands it.
- A more representative expression of the Darwin Core record would connect with the abstract graph via an *interpretive frame*.
- Different senses of scientific equivalence amount to strict identity at different levels of the model.
- For example, same data content, same primary symbol structure, or same justification.