HAPI Relationship Modeling

IVOA InterOpNov2025

Semantics

Context

- HAPI: Heliophysics Application Programmer's Interface
  - HAPI is a protocol providing access to timeseries data.
  - Several dataset at various temporal resolutions, various reference frames
  - Need to advertise relations between datasets

- Proposed « relational » metadata :
  HAPI data provider to give a table of the form
  ```
  aae/PT1S/xyz isCoordTransformedTo aae/PT1S/hdz
  aae/PT1S/xyz isCoordTransformedTo aae/PT1S/abc
  aae/PT1S/xyz isResampledTo aae/PT1M/xyz
  aae/PT1S/hdz isResampledTo aae/PT1M/hdz
  aae/PT1S/abc isResampledTo aae/PT1M/abc
  ```

So that a user can ask "give me all relationships involving aae/PT1M/hdz"

=> HAPI relations are modeled in RDF

In Progress

- Creation of a base HAPI Ontology to describe Classes
  - HAPI Service   (serving Datasets)
  - HAPI Dataset   (hosted by a Service, and containing Parameters)
  - HAPI Parameter   (within a Dataset)
  - HAPI ResamplingMethod

And to describe properties (HAPI relationships)
  - isRelatedTo
  - isCoordinateTransformedTo
  - isVersionOf
  - alsoAvailableFrom
  - resampledMethod
  - isResampledOf
  - ...

In Progress

- Creation of a turtle file with, for each Service and Dataset, instances of the classes and the relations between them

- Example

```
# relations.
:aae/PT1M/xyz/Field_Vector a hapi:Parameter .
:aae/PT1M/xyz/Field_Magnitude a hapi:Parameter .

:aae/PT1S/xyz a hapi:Dataset;
  hapi:hasParameter :Field_Magnitude .
  hapi:hasParameter :Field_Vector .

:aae/PT1M/xyz a hapi:Dataset;
  hapi:hasParameter :Field_Magnitude .
  hapi:hasParameter :Field_Vector .


# Define relations
:aae/PT1M/xyz/Field_Vector hapi:resampledMethod "mean";
  hapi:isResampledOf :aae/PT1S/xyz/Field_Vector .

:aae/PT1M/xyz/Field_Magnitude hapi:resampledMethod "mean";
  hapi:isResampledOf :aae/PT1S/xyz/Field_Magnitude .
```

OPAL Contribution / links with IVOA?

- Elsa David (OPAL) supports the HAPI team for the design of the HAPI-relations ontology.

- Could such relations be used in IVOA datalink / relations ?
  - https://www.ivoa.net/rdf/voresource/relationship_type:
    relation « isResampledOf » could be a subclass of « IsDerivedFrom »