Time Series Discovery & Access

DAL running meeting 4th November 2020

- Note describing how we can discover time series using VO protocols (M. Molinaro & F. Bonnarel 2018)

https://www.ivoa.net/documents/Notes/TimeSeriesDiscoveryAndAccess/index.html

- Description of three ways in which time series can be discovered
- Points to possible changes in existing VO standards

- The goal of this discussion: revisit the note and discuss status and possible actions (if any)

Time series discovery

1. **Source driven**: sources are discovered by e.g. ConeSearch within a catalogue and the source or sources have associated time series data

   Is ConeSearch ok for this or do we something else?

☐ Time series discovery

2. **Obscore-like driven:** repository with data and metadata specifically targeted for time series

Is ObsCore ok for this or do we need a specialisation "TSCore"?

Time series discovery

3. **Mixed search** : Obscore-like + projet specific requirements metadata of the time series and joint to the projet specific requirements

    e.g. join several tables using a common key (e.g. information on activity of host star in a planetary system, calibration, information on the).

    Is ObsCore ok for this or do we need a specialisation "TSCore"?

Time series discovery

- **Result**: a object (or list of objects) and url to point to the time series

    - **URL can be given as a VOTable LINK**

        <LINK content-type="application/xvotable+xml;content=timeseries"

        If the URL is built using a base URL + identifier in a column —> use of DataLink service descriptor

    - **Access to a DataLink {links} service instead**

        Semantics, description and format FIELDs in the {links} response will help the user to figure out which is the timeseries retrieval link, and which are additional services, metadata or formats.

Time series access

- Users might want to access the whole time series, parts of it or transform it
  - selection of one single scalar observable when several are available (e.g. select one photometric band in a "multi-band" time series)
  - conversion of Time Stamps into another Time Scale
  - rebinning of data on the TimeAxis
  - merging of data points coming from several catalogs to create a "compilation" time series

- SODA for this?
  - Good as is? Modifications?

DAL actions & status?

- **VOTable:**
  - Add the "application/x-votable+xml;content=TimeSeries" option to the content-type attribute in LINK element of VOTable — status?
- **Datalink:**
  - An extra column in DataLink will give the dataproduct_type
  - Semantics new terms: coderived, counterpart
  - How's is that interpreted by a client?
    - e.g. format VOTable + dataproduct_type=timeseries —> time plot?
    - e.g. coderived our counterpart —> simultaneous plot?
- **TsCore specification using time series specific attributes?**
  - Extend ObsTAP services to allow them to use TsCore (TsTAP)
  - Extend input parameters of SIAP-2.0 to tackle new TsCore attributes and extend the query response to TsCore (TsSAP)
  - Extend SODA input parameters for integrating more access functionalities (TsSODA)

☐ Open questions for discussion

Are there any other ways of time series discovery?

How do you discover / provide TS?

- Should we add to the list of possible discovery ways:
  - Extension of ConeSearch to include time search ?
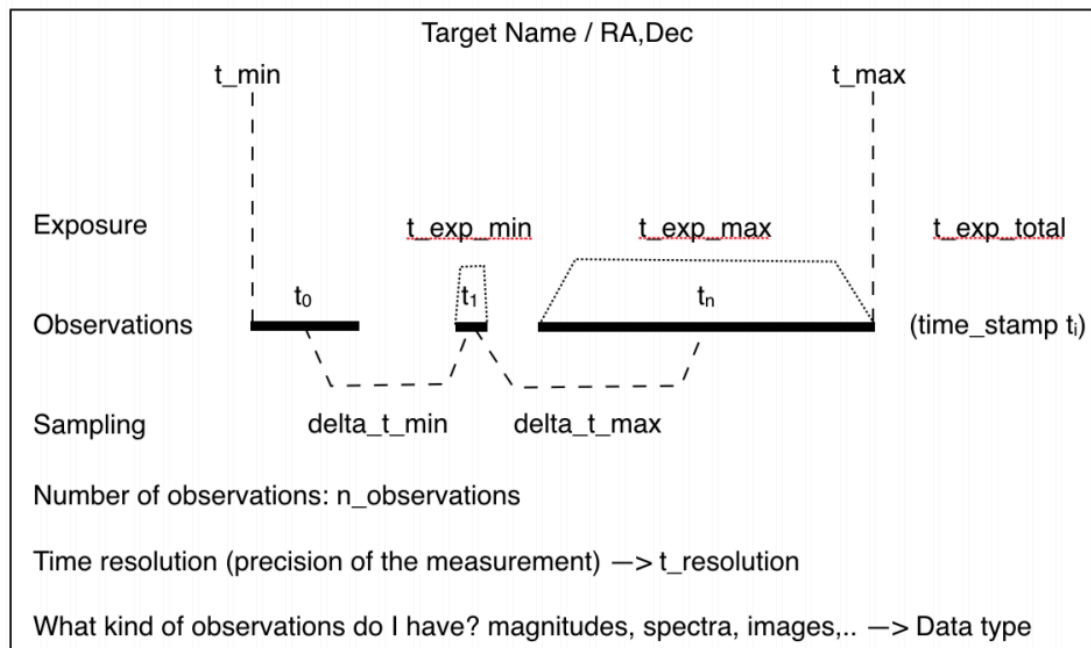 - Extension of MOC for coverages in time and space ?

☐ Open questions for discussion

Do we need an ObsCore extension or specialisation for Time Series?

- What are the minimum params for an extension ?
    - Time related params (min max exposure time, min max cadence,…time scale, time ref position?…)
    - Information on the nature of the timeseries or o_ucd enough?

- Are there other implications of such an extension to other stds?

A la ObsCore

- TsCore a la ObsCore :
  - Time related params (TIMESYS elem, exposure, cadence,…)
  - Information on the nature of the timeseries or o_ucd enough?

Field	ObsCore field name
coordinates	s_ra, s_dec
target_name	target_name
t_min	t_min
t_max	t_max
t_exp_min	-
t_exp_max	-
t_exp_total	t_exp
delta_min	-
delta_max	-
n_observations	t_xel
type_of_data	dataproduct_type[2]

Simple representation of Time Series data.

Equivalence between Time Series data fields and ObsCore

□ Next ?

- How do you expose time series in your service?

- Should we put all these things together in a single doc ?
  "DAL Protocols extensions for Time Series"