Requirements for TimeSeries

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On behalf of Asterics Tech Forum hackathon

Followed by :

DAL chair views on the topic (short)

CENTRE DE DONNÉES ASTRONOMIQUES DE STRASBOURG

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Metadata needed to describe and discover TimeSeries (1)

- Experience from SVO, High energy groups (XMM archive, SVOM project), CDS VizieR, Planetary science -ESAC, CTU Prag , GAVO, etc. ;
- Metadata needed for discovery (a)
  - Spatial coordinate system
  - Time coordinate system : scale, reference position, representation
  - Time, spectral, space and polarisation characterisation and statistics
    - Raw or mean position
    - Raw bounding limits
    - Standard deviation

Metadata needed to describe and discover TimeSeries (2)

- Metadata needed for discovery (b)
  - Time sampling characterisation and statistics
    - Mean sampling step
    - Sampling step limits
    - Sampling step standard deviation
    - Total exposure time
  - Exposure time characterisation and statistics
    - Mean total exposure time
    - mean exposure time per step
    - min, max and standard deviation of exposure time per step

Metadata needed to describe and discover TimeSeries (3)

- Metadata needed for discovery (c)
  - Characterisation on the time frequency axis:
    - Periodograms are another representation of data.
    - We can have period(s) for periodic data or variability
    - We can proceed to frequency analysis and provide coefficient and frequencies
    - Phase representation
  - What are the dependant and independant quantities
  - Nature of the dependant quantities.

Metadata needed to describe and discover TimeSeries (4)

- Which mode are the data ? Transient or periodic
  - this can be seen on periodogram or by the Target class.
- Target name, class, subclass, are needed
  - e.g. SN, eclipsing binary, spectroscopic binary,….
  - This also gives an hint of the variability type.
  - Reuse of standard vocabulary suggested.
- It would be nice to answer questions such as :
  - "have we more observations on Wednesdays or every day between one and two o'clock?"
  - Usefull to track artefacts

What do the data called « TimeSeries » encompass (1)

- It's a temporal sequence of « measurement points » containing :
  - A time coordinate and either :
    - one or several flux(es), with errors, resolution, etc.. or a derivative (mag, mag, diff etc..)
    - a radial velocity (double stars, exoplanets)
    - a position (solar activity)
    - But also :
      - Spectra
      - images

What do the data called « TimeSeries » encompass (2)

- In the latter 2 cases is it better represented as a regular cube with only one sparse axis or as an event list ?
- Should we recommand a time representation for standard output ? probably MJD ?
- Relative time for theoretical data ?

DAL chair view for a TS discovery and access

- Extend ObsCore with a new TimeSeriesCore table
- ObsTAP-TS can query both tables together
- Extend « SIAV2 » query interface to new timeSeries specific query parameters
  - And Rename « SIAV2 » in DataSetDiscovery
- Archived time series retrieval or DataLink

DAL chair view for a TS discovery and access

- Virtual data discovery (= TimeSeries produced on the fly) in SIAV2 = DsDisc. Access.reference is a SODA url
- SODA extensions to TS
  - Beside « cutout » or time selection add
    - Selection on time frequencies
    - Selection in exposure times
    - Time bining
  - Add Frequency or phase output