Characterisation of observations

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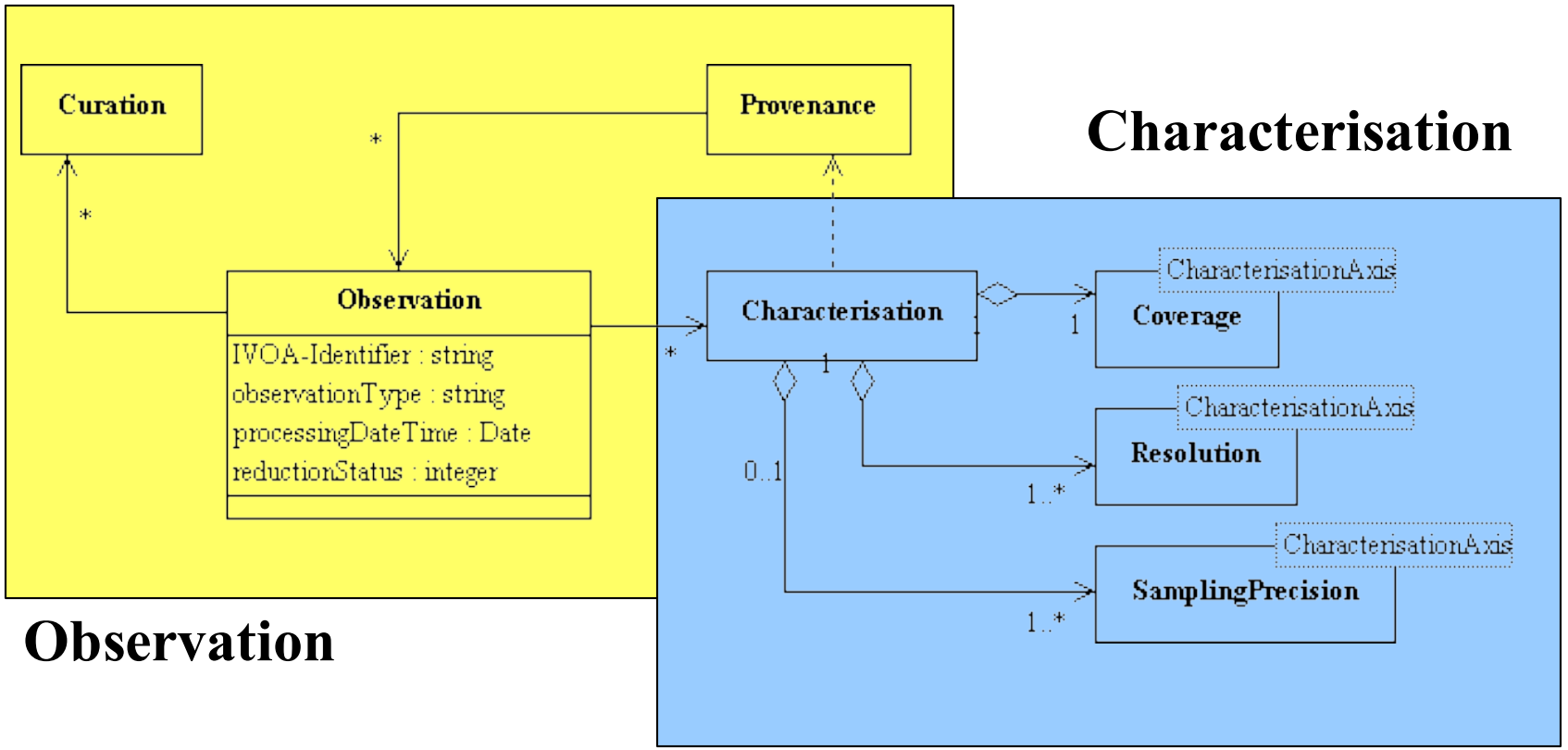
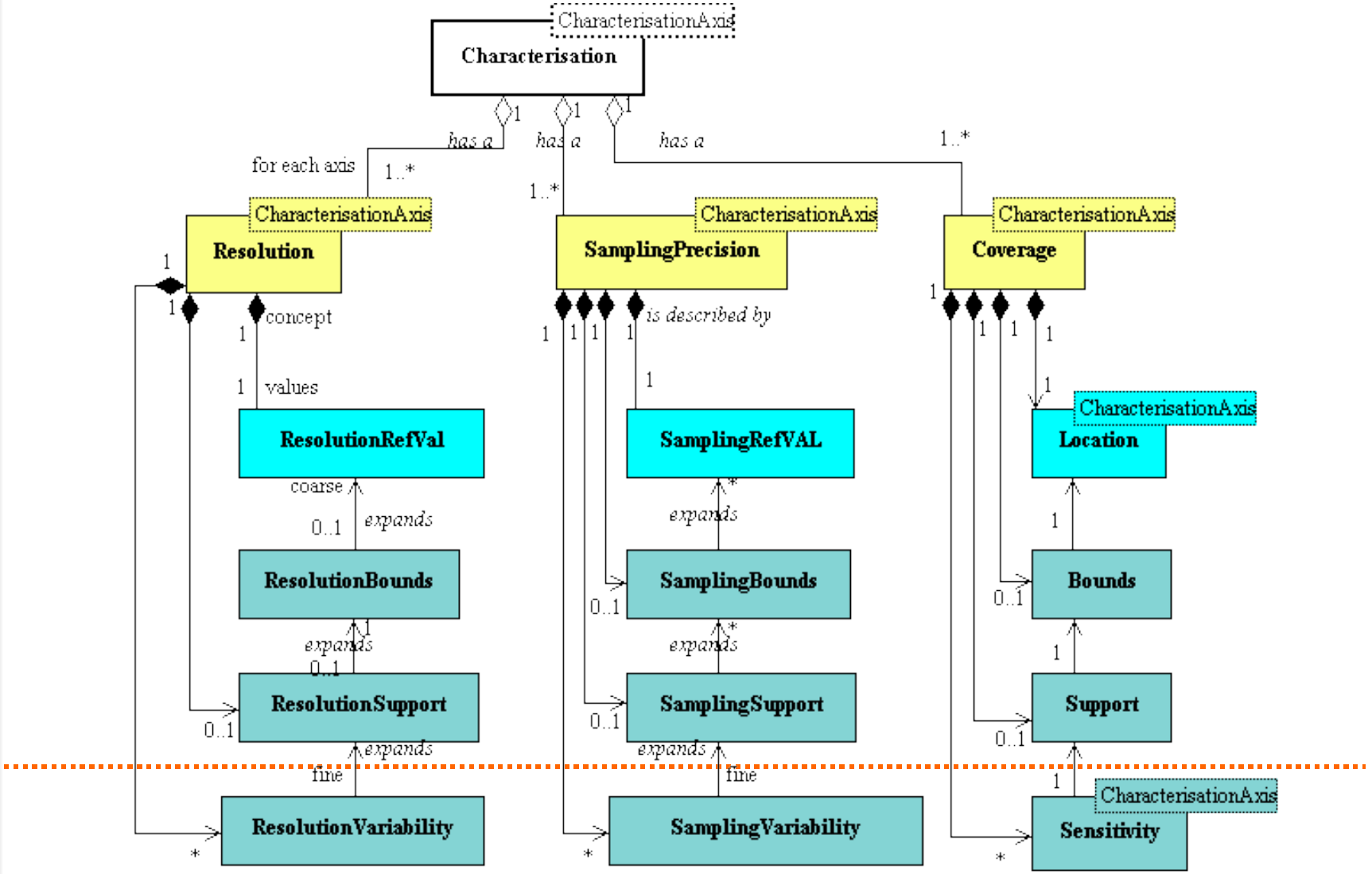
Data Models Interaction



Summary

- The main concepts needed to characterise an observation are now fully described
  - Property/Axis perspective
  - Each item can be developed as a hierarchy: increasing levels of details
- All properties and all axes are treated similarly
  - Unified framework
- This structure helps to cope with evolution: it allows to add new types of metadata in the future.

General outline



Categorising Use cases complexity (1)

- In terms of use cases :

II. Data discovery and selection — level 1-2-3

Multi regime, multi data type

Xmatch of metadata to navigate between complex datasets: cubes, spectra, images, catalogs …

Experienced in Aladin, FOV descriptions, SAADA customisable database environment

III. Advanced data processing — level 4

Physical interpretation, recalibration

Description of side products to help for data interpretation: PSF variation, transmission curve, quality maps, etc…

Categorising Use cases complexity (2)

- In terms of data types
  - More complex axes:
    - spatial, spectral, time, observable
    - + polarimetry, velocity, visibility
  - Dependencies along different characterisation axes `Resol=f(pos, em)`
  - More expertise for specific regimes as radio, polarimetric data.

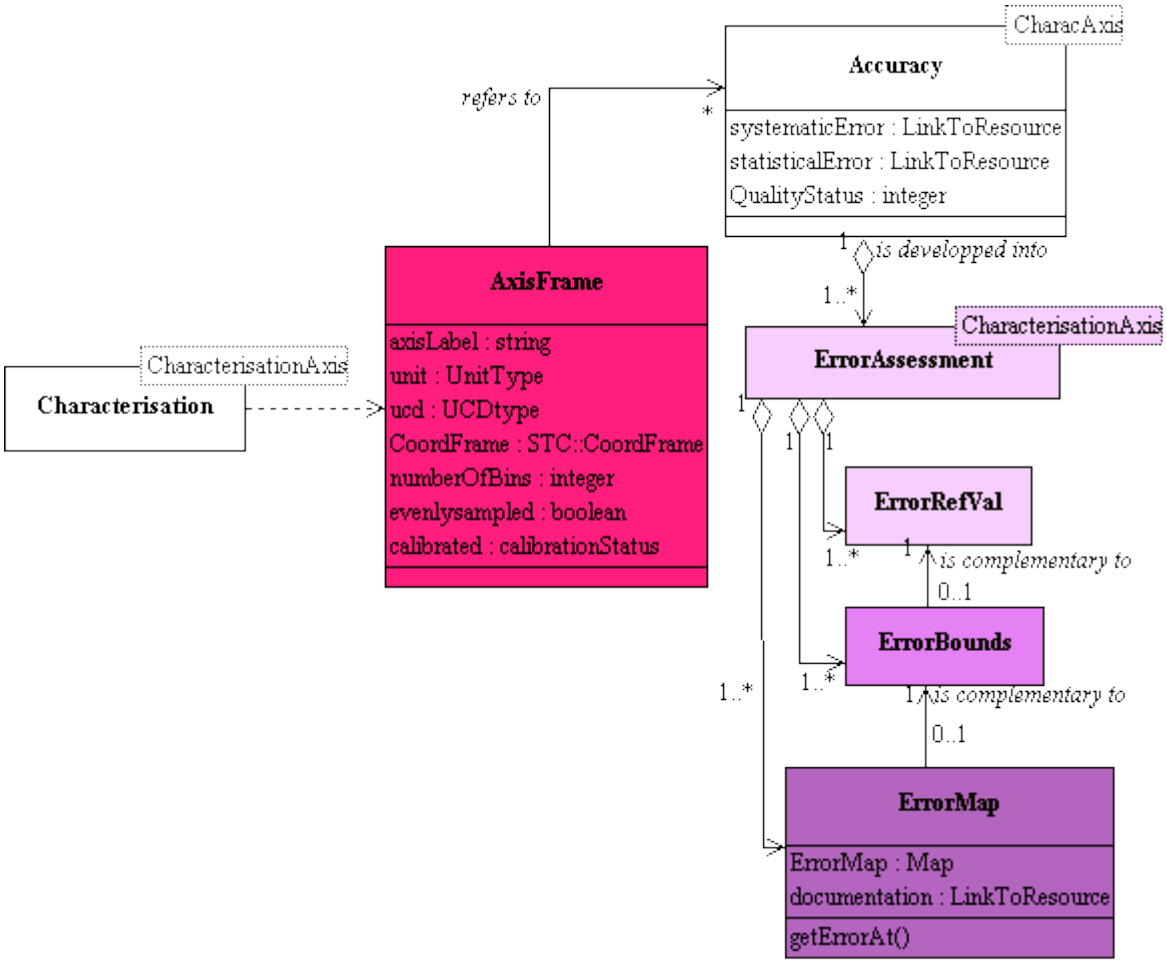
→ Schedule Version 1.0 to describe the top 3 levels and Version 2.0 to model the level 4 in details.

New features: Errors on the data

We plan to code all the characterisation items via container classes from STC or/and Quantity data models.

- Each assessed property will have the required value, unit, ucd, fields plus an error on this value.
- The typical error on the data, that is the error we make when we map sampling elements to coordinates, is also needed .
  - Here we accomodate astrometric error, photometric error, etc…
  - They will be attached to the axis on which the mapping is done: spatial, observable, etc…
- Valid for both systematic and statistical errors.

Axis description and mapping error



New features : Sampling

- For the SamplingRefVal class (level1)
- attributes
  - **samplingPeriod** : records here the value of the sampling period along the axis in question.
  - **sampleExtent** : an average estimation of the bin size along the characterisation axis.
  - **documentation** : a url to point to some description of the sampling process , for instance.
- methods

  getNyquistRatio() **resolutionRefval** and **sampleExtent**

Using the data model

- ***Utypes*** are derived from the hierarchical structure
- Charaterisation XML Schema

  http://alinda.u-strasbg.fr/Model/Characterisation/

- From these we can :
- instantiate description of real data
  - As VOtable document,with ***Utypes*** references,
  - As XML documents

Implementations (to do)

- DAL VOtable+Utypes

  SIA 1.1 can provide implementation as Using GROUP and FIELDS
  - Level 1 & 2
  - Level3 and 4, developped in extensions
- Web services Xml schema compliant or VOTABLE +Utype
- Interface Aladin with a web service providing the full characterisation of the observations available in the server via get and SOAP methods
- Use case exemple:

On-the-fly SED construction from Vizier sources
  - Select radio sources from catalogs
  - Point to the related observations from Aladin and get characterisation metadata
  - Check for **location, error** and **resolution** on spatial axis , **bounds** on spectral axis
  - Use the characterisation values to validate the source type with respect to a radio source model (error bars)

Conclusion

- Characterisation DM is now complete and usable
- The logical structure of the XML schema is ready.
- Different instances documents of the schema produced.
  - 3D IFU by Igor Chilingarian
- Implementations are taking place
- Characterisation draft to be issued end of October.