



VIRTUAL ASTRONOMICAL OBSERVATORY

Feedback from Coding Efforts

Janet DePonte Evans, Mark Cresitello-Dittmar (SAO)



The VAO is operated by the VAO, LLC.

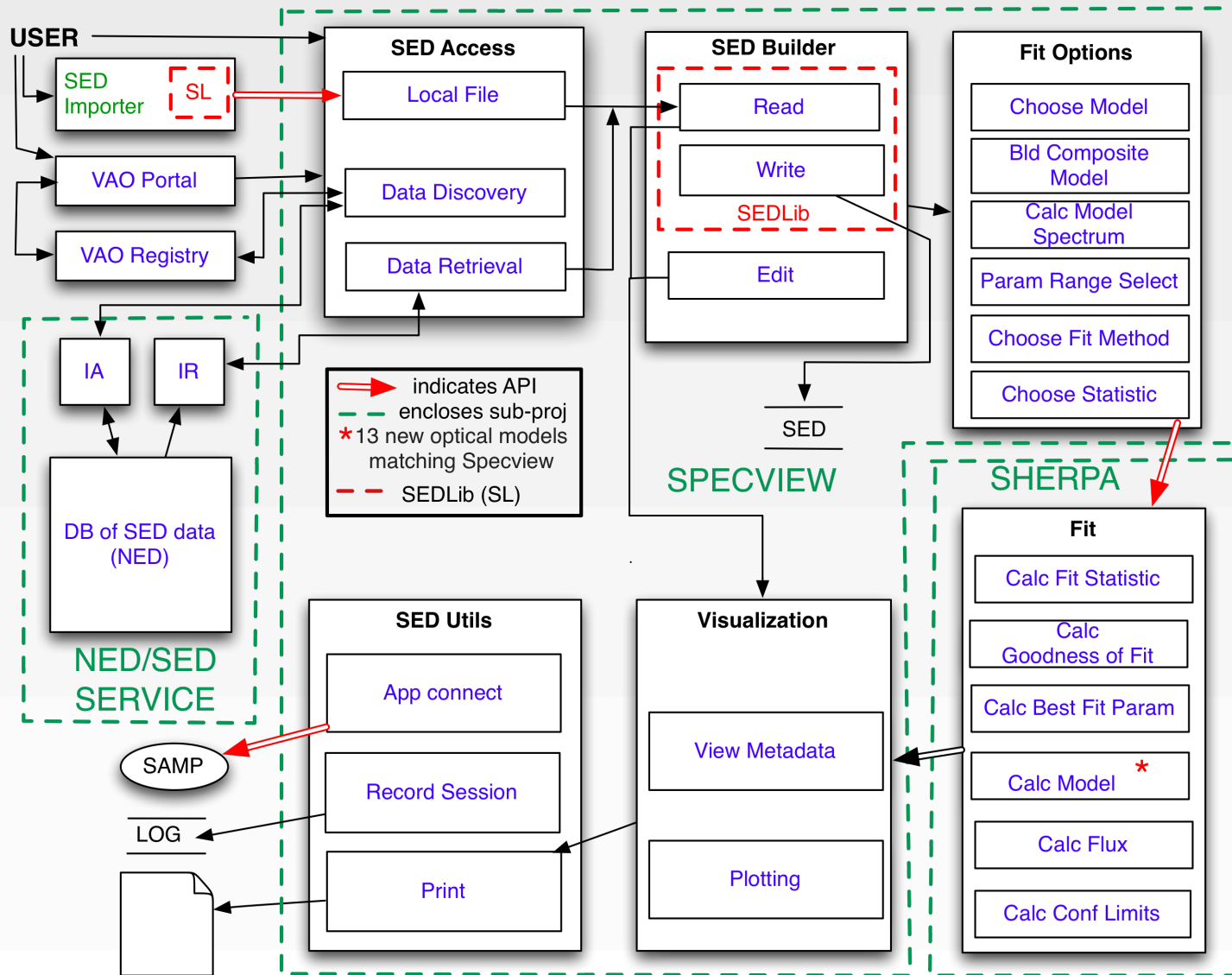


VAO SEDLib

- The SED Library is a Java software package and provides the ability to read, write, and manipulate information contained in an SED file
- The library classes correspond to the objects described in the "IVOA Spectral Data Model - Version 1.03"
- The relationship between the objects as well as their content closely match the schema presented in that document



VAO Iris Walkthru Block Diagram





Doc Feedback:

- Scope
- Structure
- Serialization
- Extensibility
- What's missing
- What's confusing or didn't work
- What Standards do we need for the VAO SED Access and Analysis project



Doc Feedback: Scope

The document often refers to things outside of the Spectrum DM scope

- SED
 - Several sections refer to SEDs and how Spectra will be combined
 - XML schema defines the spectrum and goes beyond to also define the SED object
 - FITS serialization design goes into detail about how to serialize multiple spectra in the same file



Scope cont.

- SSA
 - Simple spectral access is a model which uses the Spectrum data model. As such, the SSA model should refer to the spectrum document, not the other way around.
 - Section on ‘Packaging Model’ describes an object to define the format of the dataset and the allowed values
 - Not used at all in the SedLib implementation
 - Utypes section has detailed description of how SSA will modify the Utype definitions
 - What if SSA didn't do it in that way? or changes in future versions? Does this document change?



Scope cont.

- Units & UCDs
 - Document has a detailed description of Unit and UCD syntax and formatting
 - If each model describes this sort of thing individually, then it becomes increasingly difficult to code support for units
 - Suggest Units & UCDs become a reference to an IVOA Standard or Convention document
 - With established conventions, then standard implementations could be written and incorporated into other applications (e.g. someone could write a units library and others could use it)



Doc Feedback: Structure

- An important part of understanding a document is the organization of the information and we found this document awkward
- Several diagrams at the start lay out the various concepts which make up a 'Spectrum'
 - Diagrams are not referenced anywhere in the document
- Presentation of the information is bottom-up instead of top-down
 - Document moves outward to larger scale objects, ending with Spectrum - the top block of the first diagram
 - First part of the model to be described is how to represent Units, which is not a model component, but a convention expected to be used in implementations of the model



Doc Feedback: Serializations

- Serializations are not part of the model
 - Serve as an example (which is great) to help clarify the model descriptions and maybe set a convention or standard, but they should be considered optional
- If Serializations are included:
 - Put them as appendices to the model rather than numbered sections of the model
 - Take GREAT care that the examples follow the model and are accurate. An example, is considered a 'free test file' by the developer. If we pull out the example, and it does not work, the whole document loses credibility
 - Issues seen include
 - + misnamed utypes
 - + value datatypes not matching schema



Doc Feedback: Extensibility

- Having the model include user-defined information is a definite plus
 - NED data includes many pieces of information, mainly pertaining to the 'as published' condition of the data
 - Allows prototyping of concepts proposed for future versions
 - Enables current software to 'handle' files following a higher version
- Extensibility clause may not meet intent
 - Allows the addition of keywords or columns of any datatype and dimensionality. The base model allows scalar double, int, and string data values only. To support the extra datatypes adds a great deal of complexity to an otherwise simple model.



Extensibility cont.

- Extensibility clause may not meet the intent (cont.)
 - Allows the addition of a column outside of the data object; Difficult to accommodate in a model which organizes all column data within a 'Data' group
 - Defines different levels of 'extensibility' for different serialization formats (e.g. GROUP)
- Suggest to incorporate the Extensibility objects into the model
 - Correct inconsistency of 'CustomParam' between the model and the schema
 - Include an object to hold general column information
 - Include instructions for defining Utypes for these objects



What's missing

- SED model
 - SEDLib currently using a 'default' model where an SED is simply a list of Spectrum segments. We need a model which describes an 'Aggregate' of independent segments, as well as the type that supports NED – a collection of photometry points homogenized to the same units (Uniform SED).
- Segment Type
 - It is unclear how to distinguish (or define) different types of spectra. If we want to write model data derived from Fit results as a segment of our SED, how do we indicate that the new segment contains 'Theoretical' data?



What's confusing or didn't work

- FITS serialization and keyword mapping
 - Understanding the difference between 2 specific Utypes:
 - Data.FluxAxis.Quality & Data.FluxAxis.QualityN
 - Instructions for populating keywords from data columns
- Coverage support: Range attribute
 - Interval object when serialized loses information you need to reconstruct the components (e.g. name)
 - XML: `<min name="spmin">4.02</min>` -- fully definable
`<max name="spmax">4.22</max>`
 - VOT: `value="4.02 4.22"` -- restricted
- Links to documents and standards that are included within the text
 - Suggest they move to a reference section for easy lookup



In Closing ...

- What Standards are needed by our project
 - IVOA Spectrum DM V1.2
 - IVOA Photometry DM
 - IVOA SED DM
 - IVOA SED Access protocol
- Hopefully our feedback provides practical developer perspective

Thank You for your IVOA Standards efforts !!!!