

Collection of VO related thoughts and issues

SLAC and IPAC teams are working on the APIs for data access. We need to think about the requirements that VO protocols and standards at the beginning, especially the required fields when we collect meta data. Here is the collections of our thoughts and issues. **This is work in progress. Feel free to edit.**

- TAP Here is the IVOA standard for [Table Access Protocol](#).
- SIAP Here is the IVOA standard for [Simple Image Access Specification](#). The required meta data fields for image:
 1. **NAXIS**The size of the output image in pixels. This is a vector-valued quantity, expressed as "NAXIS=<width>,<height>". If only one value is given it applies to both image axes. Default: determined from the ROI (see below). This is the only image generation parameter likely be supported by a cutout service.
 2. **CFRAME**The coordinate system reference frame, selected from ICRS, FK5, FK4, ECL, GAL, and SGAL (these abbreviations follow CDS Aladin). Default: ICRS.
 3. **EQUINOX**Epoch of the mean equator and equinox for the specified coordinate system reference frame (CFRAME). Not required for ICRS. Default: B1950 for FK4, otherwise J2000.
 4. **CRPIX**The coordinates of the reference pixel, expressed in the pixel coordinates of the output image, with [1,1] being the center of the first pixel of the first row of the image. This is a vector-valued quantity; if only one value is given it applies to both image axes. Default: the image center.
 5. **CRVAL**The world coordinates relative to CFRAME at the reference pixel. This is a vector-valued quantity; both array values are required. Default: the region center coordinates (POS) at the center of the image, transformed to the output coordinate system reference frame if other than ICRS. If CRPIX is specified to be other than the image center the corresponding CRVAL can be computed, but should be specified explicitly by the client.
 6. **CDEL**The scale of the output image in decimal degrees per pixel. A negative value implies an axis flip. Since the default image orientation is N up and E to the left, the default sign of CDEL is [-1,1]. This is a vector-valued quantity; if only one value is given it applies to both image axes, with the sign defaulting as specified above. Default: implied (see below), otherwise service-specific.
 7. **ROTANG**The rotation angle of the image in degrees relative to CFRAME (an image which is unrotated in one reference frame may be rotated in another). This is the rotation of the WCS declination or latitude axis with respect to the second axis of the image, measured in the counterclockwise direction (as for FITS WCS, which is in turn based on the old AIPS convention). Default: 0 (no rotation).
 8. **PROJ**The celestial projection of the output image expressed as a three-character code as for FITS WCS, e.g., "TAN", "SIN", "ARC", and so forth. Default: TAN.
- SSA Here is the IVOA standard for [Simple Spectral Access Protocol](#). The required meta data fields for spectrum:
 1. Access.Reference -- URI (URL) used to access the datas
 2. Access.Format -- MIME type of dataset
 3. Dataset.DataModel -- Datamodel name and version (Spectrum-1.0)
 4. (*)Dataset.Length -- Number of points in spectrum DataID.Title -- Dataset title
 5. Curation.Publisher -- Publisher
 6. Char.SpatialAxis.Coverage.Location.Value -- Observed position, e.g., RA DEC
 7. (*)Char.SpatialAxis.Coverage.Bounds.Extent -- Aperture angular diameter, deg
 8. Char.TimeAxis.Coverage.Location.Value -- Midpoint of exposure (MJD)
 9. Char.SpectralAxis.Coverage.Location.Value -- Midpoint of Spectral coord range
 10. Char.SpectralAxis.Coverage.Bounds.Extent -- Width of spectrum in meters

(*)Dataset.Length is mandatory and specifies the "length" of the spectrum, i.e., the number of data points or samples.

(*)The aperture field is important to determine what part of an extended object is contributing to the spectrum; we allow a simple aperture description (Char.SpatialAxis.Coverage.Bounds.Extent) consisting of a single number representing the aperture size in decimal degrees. For a slit spectrum, the effective aperture on the sky is usually the slit width in the cross-dispersion direction... Note that since the goal of the VO Spectrum description is to describe the data as it is now, not to describe where it came from, our 'aperture' is always the effective extraction aperture, not the original instrument aperture if that is different.
- VOEvent Here is the IVOA standard for [Sky Event Reporting Metadata](#)