IVOA Data access layer project

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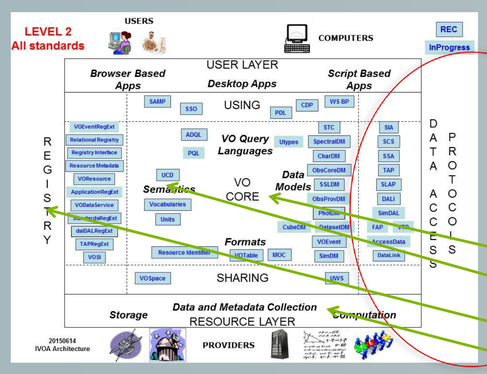
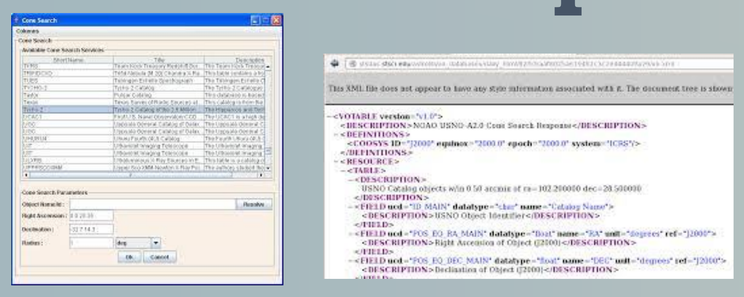
IVOA DAL Working Group Project and Objectives



DAL within IVOA Architecture

- ***A group created at the very beginning of International VO alliance***
- ***Goal is to define protocols to homogenize***
  - ***data discovery,***
  - ***data description,***
  - ***data retrieval,***
  - ***data access processes:***
    - ***providing direct client access to dynamically computed subsets of remote astronomical datasets***
- ***Relationships with***
  - ***Data Model : query based on data model concepts, responses are serialised instances of data models***
  - ***Semantics: use of standardized vocabulary***
  - ***Registry : standardized description and discovery of the services***
  - ***UWS : asynchronous mode support***

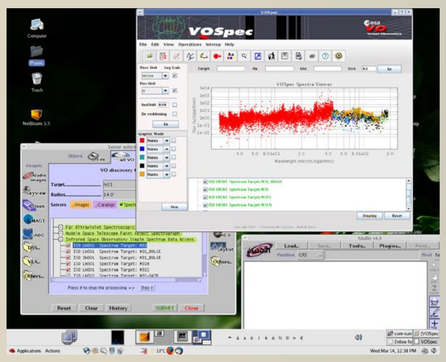
Historical protocols



ConeSearch interface and VOTABLE query response

- ***1st generation:***
  - ***Cone search : simple ROI constraint for catalog of sources. VOTABLE output***
  - ***Simple Image Access : ConeSearch and other additional parameters constraints.***
    - ***VOTABLE query response for data discovery giving standardized image description.***
    - ***Retrieval and "Mosaic" generation.***
  - ***Simple Line Access***
- ***2nd generation***
  - ***SSA : Simple protocol like SIA but expressed in terms of a comprehensive spectral data model***
  - ***TAP : interoperable relational model query services***

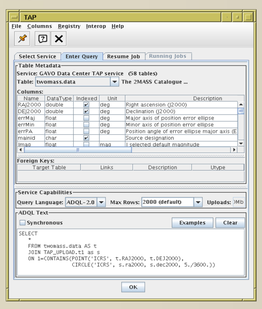
Simple Spectral Access



Spectrum discovery with SSA Display in VOSPEC

- ***Standard query parameters to constrain all axes***
- ***Additional Optional PARAMETERS (APERTURE, SPECRP, TIMERES, etc…)***
- ***Query response is a VOTABLE***
  - ***Organized in GROUPS mapped from Spectrum Data Model packages:***
    - ***Dataset, Curation, Derived, Characterisation, Coordinates, etc…***
  - ***Model attributes tagged with utypes***
- ***Virtual data generation:***
  - ***services typed cutout or mosaic generate a "best match to query parameters"dataset***

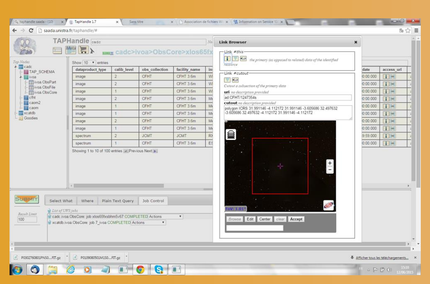
TAP and ADQL



TAP service interface within TOPCAT

- ***A standard protocol to expose and query relational tables***
- ***RESTful service where asynchronous mode is consistent with IVOA Universal Worker Service standard***
- ***Structure and Model exposed with the TAP_SCHEMA and VOSI-table descriptions: standardized metadata***
- ***Query via ADQL language (astronomical extension of SQL)***
- ***ObsTAP: standard data model (ObsCore) exposed via a TAP service to support uniform cross-wavelength data discovery***

Recent or current developments of new protocols



ObsTAP response within TAPhandle and DataLink

- ***collection of service capabilities (components) to provide multi-dimensional data discovery and access (science priority)***
  - ***DataLink : Standardized methods to link resources to known datasets***
  - ***SIAV2.0 : parameterised query (PQL) of the ObsCore 1.1 data model for simple interoperable data discovery***
  - ***AccessData : Driving Server-side processing for excerpting information from the datasets***

Lessons learned from DAL development

- ***science use cases often involve using a collection of services in a sequence of steps:***
  - ***in general, one service cannot always satisfy requirements***
- ***moving toward modularity:***
  - ***single purpose service capabilities that can be combined to support science use cases***
- ***common patterns and features:***
  - ***extracted into Data Access Layer Interface (DALI) for easy re-use and consistency***
- ***Two « branches » of protocols exist :***
  - ***Relational-model protocols (more complex, more powerfull) versus object-model protocols (simpler, implementation flexibility, usability)***
- ***Open question of Parameter Query Language purpose***
  - ***Input/output homogeneity versus readibility***