ESO Archive Services Project

ASTERICS DADI

Technology Forum 3

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ESO Archive Services Project

- Build new access services with the aim to maximise the scientific exploitation of the ESO data holdings

- 3-year stage approach:
  - Release 1, end of 2017
  - Release 2, end of 2018
  - Release 3, tbd

What does it cover?

- WP0: Overview & Management (Romaniello, Zampieri)
- WP1: Web Interface (Retzlaff, Delmotte, Zampieri)
- WP2: Preview, HiPS, MOCs (Hainault, Forchi')
- WP3: Programmatic & Tool Access (Micol, Forchi')
- WP4: Database Architecture & Contents (Vera)

WP0: Overview & Management

- Top level requirements
- Project plan
- Management (Reviews, Meeting minutes, etc.)
- Access policies

  - [ops-01b] **Authenticated access to non-proprietary pixel data**
  - For a variety of reasons, the main one being linking users to a postal address to send hardcopies of the data to, authentication is currently extended also to non-proprietary data.

- Tools (topcat, aladin, etc.) cannot access ESO data

WP4: Database Achitecture & Content

- Database study spatial queries
  - **MS SQLServer, Postgres+PgSphere, ElasticSearch**
  - Postgres does not support UNION of polygons;
  - Postgres does not support one-geometry-datatype for all-ESO-geometries (if multiple dataypes required, then multiple tabular columns needed)
  - Postgres does not support distance between point and polygon
  - Better performances wrt Postgres when search radius increases (at least with vanilla test-installation)
  - Postgres CENTROID (actually, CENTER) supports only circles and ellipses: not generic enough.
  - PgSphere: support in the mid/long term?
  - PostGIS?
  - SQLServer maximum circle radius: 179.82 deg (0.9999 pi)
  - SQLServer: CIRCLE is a POLYGON

WP1: Web Interface

Planning for a rich experience

- Users place query constraints via 4 panels:
  - Query Form (HTML)
  - Sky View (Aladin Lite?, HiPS, previews)
  - Aggregations (Histograms, Facets)
  - Plots (Scatter plots of the different parameters) [*]
- Users examine query results in 4 panels:
  - Tabular output
  - Sky View
  - Aggregations
  - Plots [*]

[*] Not in Release 1.

WP1: Web Interface

- Angular: GUI development + AladinLite (likely)
- ElasticSearch: aggregation/facets + spatial queries
- ESO: ElasticSearch plugin for astronomical spatial queries (unit sphere).

Carefully calibrating all user's actions across different panels. User experience must be intuitive, self-explanatory, agile, responsive, and useful. Rich experience requires a lot of attention.

Web Interface: Scope of REL1

Scope of RELEASE 1

- Constraint form
  - Focus on coverage in terms of sky, time, energy
  - Limited selection of most important keywords (wavelength range, program ID, date of observation, product type)
  - Query by position (RA/Dec, cone search)
- Sky view
  - Display/Choice of background imagery
  - Zooming, panning
  - Select & highlight footprints
  - Display previews

Web Interface: Scope of REL1

- Tabular view
  - Sorting by query parameter
  - Row selection and footprint highlighting
  - Display preview
  - User login (for download)
  - Download All/selected/highlighted data
- Histogram view
  - Pre-defined bins for limited set of parameters
- Info center
  - Summarize inter-dependencies
- Page Layout: Fixed layout

Web Interface: Not in Scope of REL1

Examples:

- Scatter plot
- Polygonal region search
- Tabular view
  - Advanced grouping of tabular records (by object, program, bibref, etc.)
  - Detailed view, Instant download, etc.
- Histograms (customizable, query by, etc.)

Web Interface: Not in Scope of REL1

Examples:

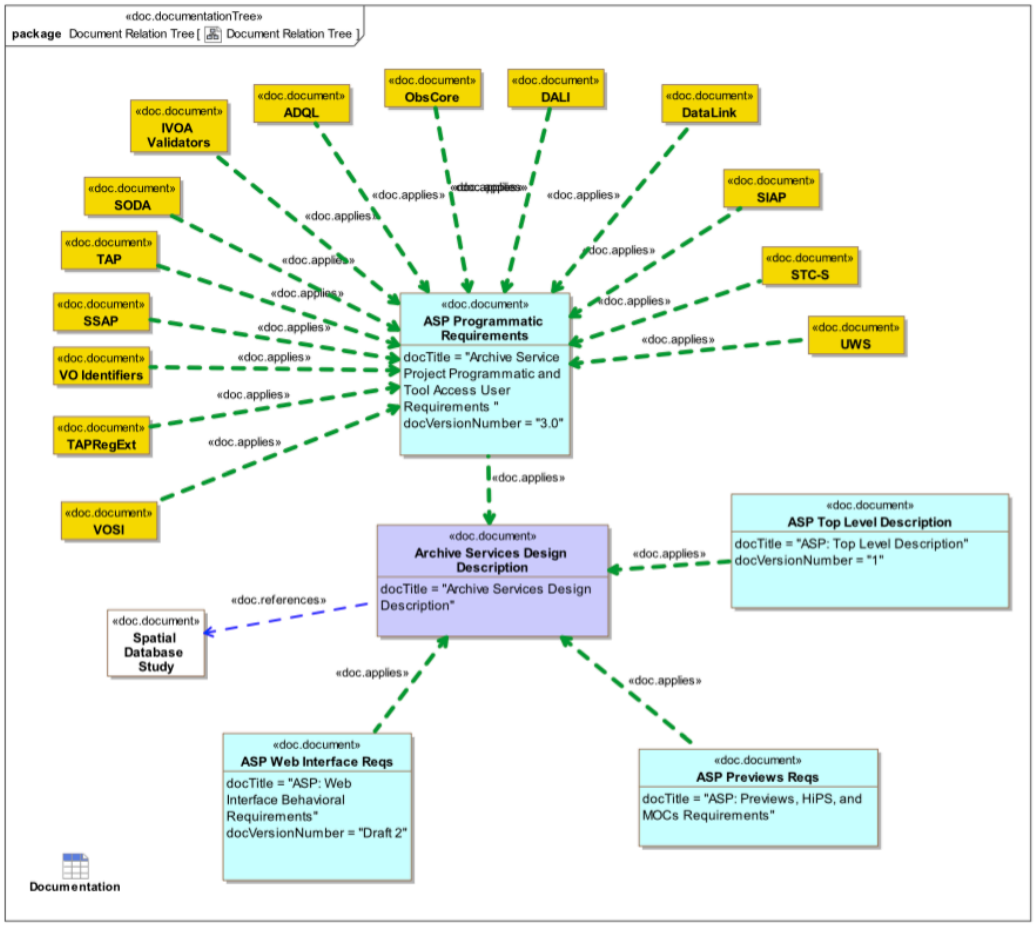
- Sky view
  - Overlaying background imagery
  - Changing contrast ?
  - Distance measure ?
  - Trigger Cone search (drawin on the i/f) ?
  - Rectangular region search ?
  - Adapt the level of detail to the display ?
    - Crowding: density map? Number of footprints?
  - Footprint selection by mouse-click ?
- Page layout: Re-arranging GUI elements

WP2: Preview, HiPS, MOCs

- Previews will be generated for SAF assets
  - Scope release one: reduced spectra and images
  - Later releases: IFU cubes, catalogs, visibilites, …
- Selected formats for Web and Print (pdf)
- Thumbnails (PNG) for all types
- 1D Spectra: interactive plot (zoom, pan) =>JSON
- Large-format images (e.g., 9GB) =>HiPS

WP3: Why am I here?

Chapter 2. Related Documents



WP3: Programmatic & Tool Access

- Release 1:
  - TAP
  - TAPRegExt
  - ObsCore
  - SSA (based on TAP?)
  - DataLink
  - IVOA Identifiers
- Later releases:
  - SIA
  - Server-side Operations for Data Access

WP3: Programmatic & Tool Access

- taplib by G.Mantelet (github)
  - Very good, easy to use, well documented!
  - In GitHub!
  - Very responsive to new issues!
  - Implements ADQL2.0
    - Plans for ADQL2.1 ?
  - UWS: Job nodes not protected
    - Plans to improve security?
- Taplint by M.Taylor (STIL): validation
- ESO: ADQL to MS SQLServer (spatial)

WP3: Programmatic & Tool Access

- ESO: Two TAP implementations
  - TAP 1: MS SQLServer for Archive Database Tables
    - Standard queries and access:
      - ObsCore (reduced data)
      - SSA (reduced 1d spectra, 80% of all reduced data)
    - Complex queries:
      - observing log (raw data)
      - ambient conditions
      - scheduling
  - TAP 2: SYBASE IQ for big astronomical catalogues
    - Limited spatial capabilities (built by ESO on HTM):
      - Cone search
      - Box search

WP3: Programmatic & Tool Access

- ObsCore for all reduced data
  - **images, spectra**
  - cubes, source tables, catalogs, visibilities

- Could ObsCore and SSA UTYPEs be unified?
  - e.g. RA:
    - Char.SpatialAxis.Coverage.Location.Value (SSA)
    - Char.SpatialAxis.Coverage.Location.Coord.Position2D.Value 2.C1 (ObsCore)
  - Specialised or generic UTYPEs?
    - obscore:access.reference, ss:access.reference
    - access.reference

WP3: Programmatic & Tool Access

- SSA:
  - 78% of all ESO products are 1d spectra
  - will be implemented onto TAP
  - Validator? VO Paris' would be good, but we need it within ESO firewall.

- DataLink
  - Libraries?
  - Validators?

ESO Archive Services

Thanks!