Observatorio Astrofísico de Javalambre: VO Services

Tamara Civera Lorenzo

Scientific Database and Web Access Engineer (CEFCA)

IVOA April 2022

Observatorio Astrofísico de Javalambre (OAJ)

- Spanish astronomical ICTS (Unique Science and Technology Infrastructures)
- Located at Javalambre mountain range in **Teruel, Spain**
- Conceived and constructed by **CEFCA** (Centro de Estudios de Física del Cosmos de Aragón)
- For **carrying out large sky astronomical surveys**

Telescopes and Instrumentation

JAST80 (Javalambre Auxiliary Telescope) + T80Cam

FoV 2deg

CCD 9.2k-by-9.2k, 10 μm/pix

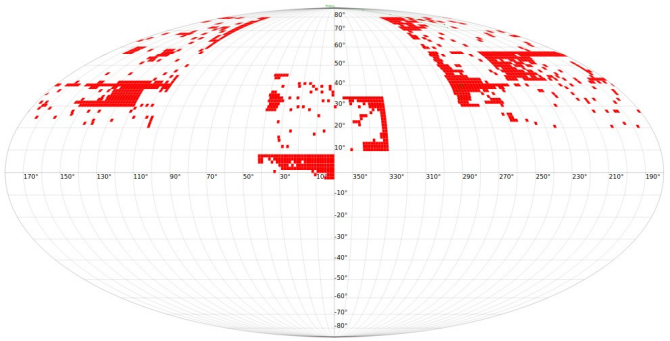
JST250 (Javalambre Survey Telescope) + JPCam

FoV 3deg

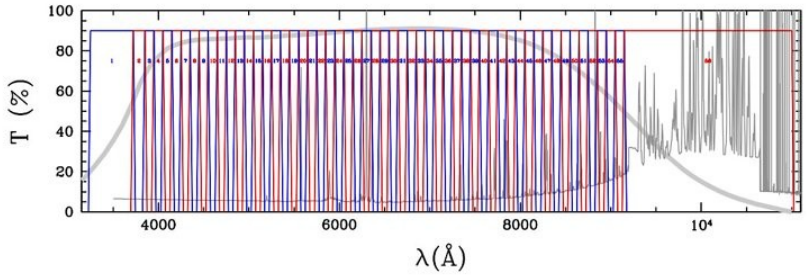
14 CCD-mosaic

J-PLUS and J-PAS Surveys

- **J-PLUS:** Javalambre-Photometric Local Universe Survey
  - Photometric sky survey of 8500 deg^2
  - JAST80 + T80Cam
  - 12 broad, intermediate and narrow band filters
  - http://www.j-plus.es

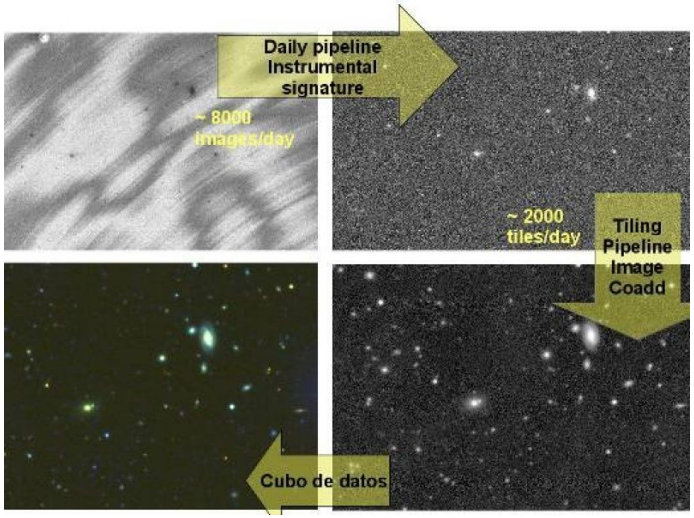


- **J-PAS:** Javalambre Physics of the Accelerating Universe Astrophysical Survey
  - Photometric sky survey of 8500 deg^2
  - JST250 + JPCam
  - 54 narrow and 5 broad band filters
  - http://www.j-pas.org



Data Processing and Storage

- Unit for Processing and Data Archiving (UPAD)
- Daily data processing and full DR re-processing
- Long-term storage

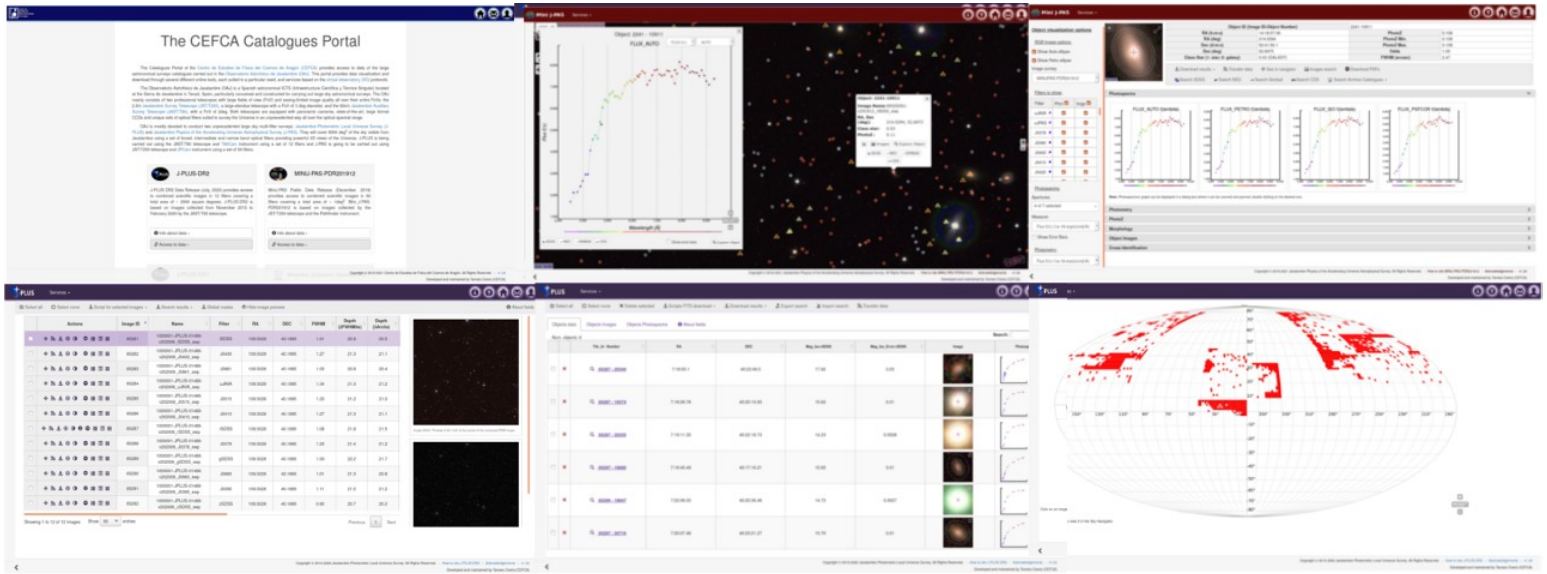


Data Publication: Archive Content

- **Reduced Individual Images**
- **Coadded Images**
- **Catalogues data**
  - Parameters measured from coadded images + Computed photo-redshifts + Added value catalogues
  - **Single-mode catalogue data**
  - **Dual-mode catalogue data**

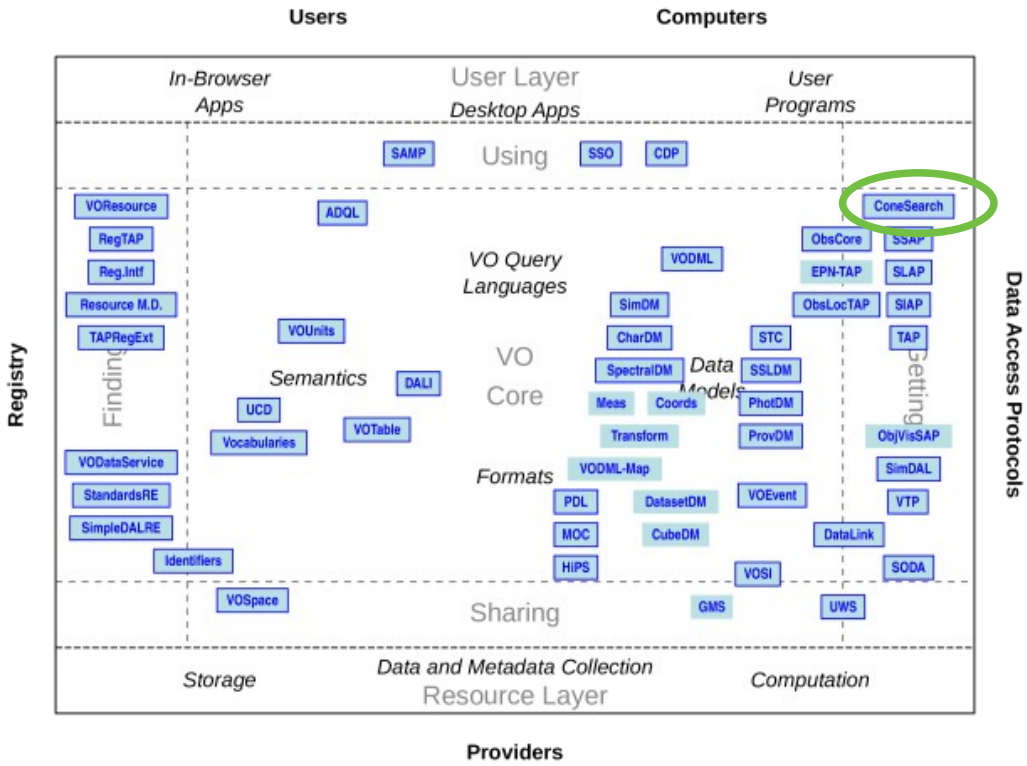
Data Publication: CEFCA Catalogues Portal

- **Web portal:** https://archive.cefca.es
- **Web user interface services:**
  - Sky navigator, image search, object list search, object visualization, asynchronous queries, coverage map
- **VO services**



CEFCA Catalogues Portal: VO Services

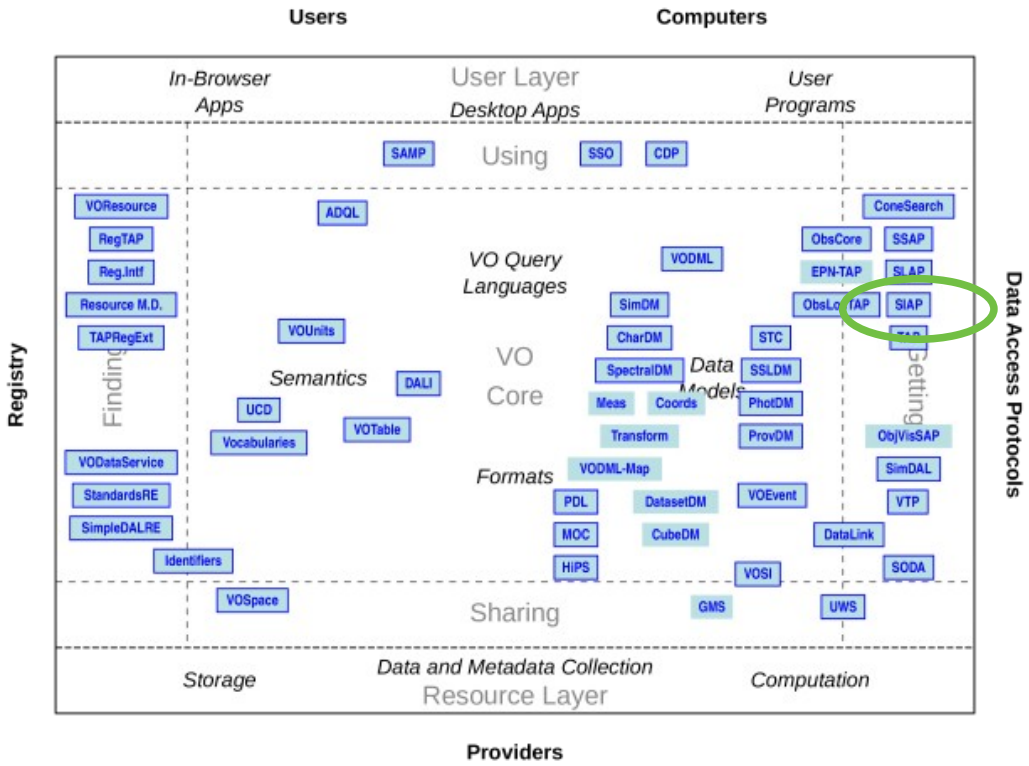
SCS - Simple Cone Search



- **Dual and Single Catalogues data** search
- Version: SCS 1.03
- Several SCS services by survey and DR

CEFCA Catalogues Portal: VO Services

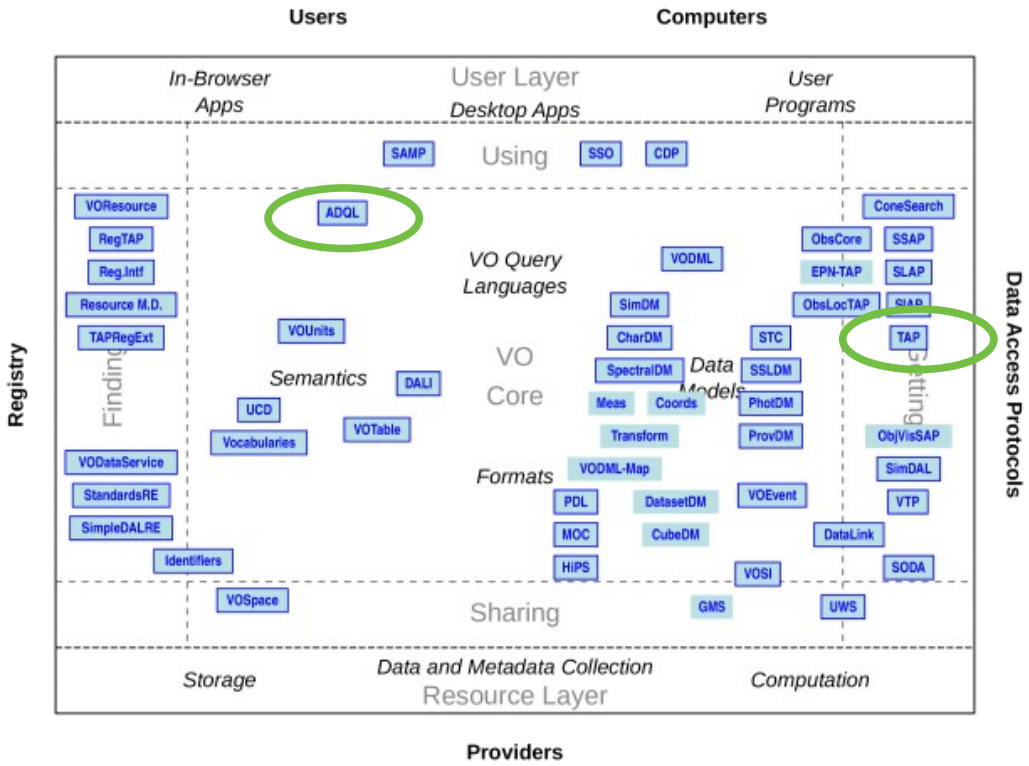
SIAP - Simple Image Access Protocol



- **Coadded images and Reduced Individual images** search and download (full and cutouts)
- Version: SIAP 1.0, SIAP 2.0
- Several SIAP services by survey and DR

CEFCA Catalogues Portal: VO Services

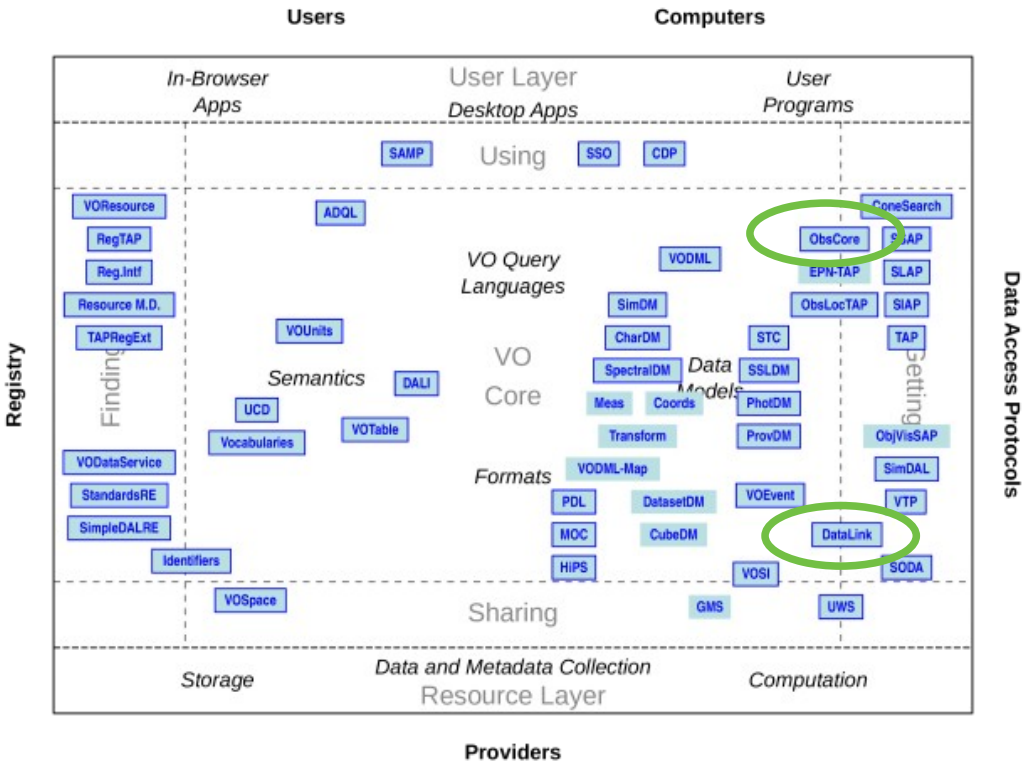
TAP - Table Access Protocol



- Dual and Single **catalogue data**, **images data**, **derived data** (photo-redshifts, added value catalogues,...) advanced search
- Version:
  - TAP 1.1
  - ADQL 2.0 (2.1 in testing)
- One TAP service by survey and DR
- Extension: Enumerations to assign names to filter positions
- Extension: Array functions

CEFCA Catalogues Portal: VO Services

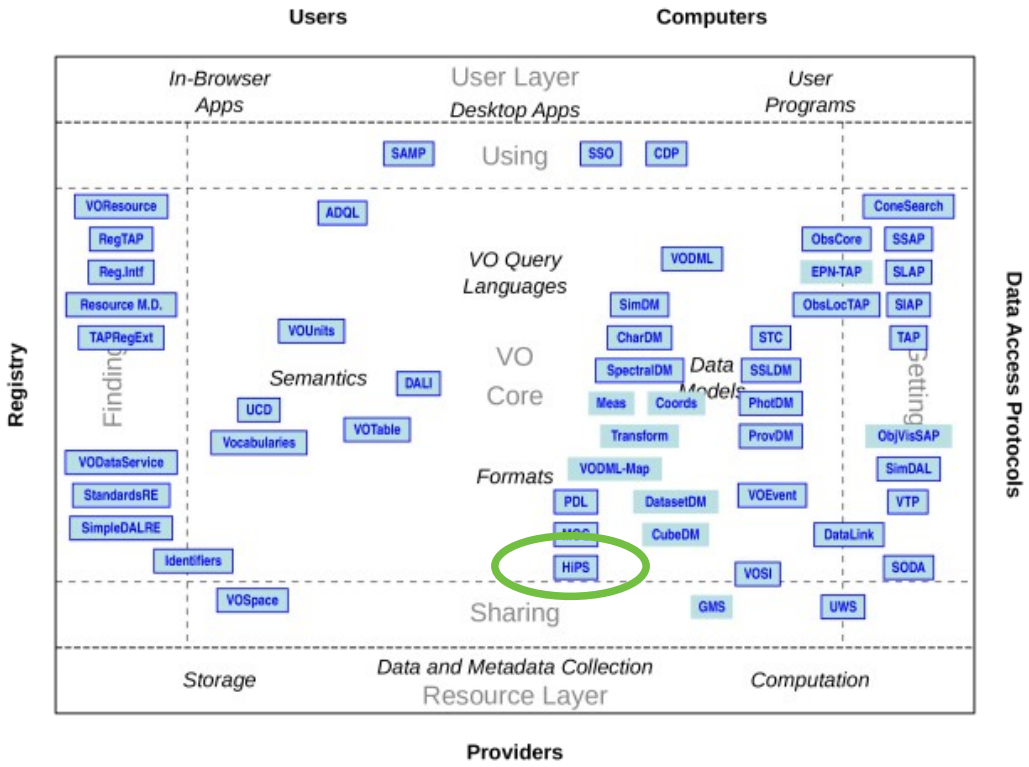
TAP - Table Access Protocol - Obscore



- **Images** and Dual and Single **catalogue data** search and download
- Version:
  - Obscore 1.1
  - Datalink 1.0
- One Obscore service by survey and DR

CEFCA Catalogues Portal: VO Services

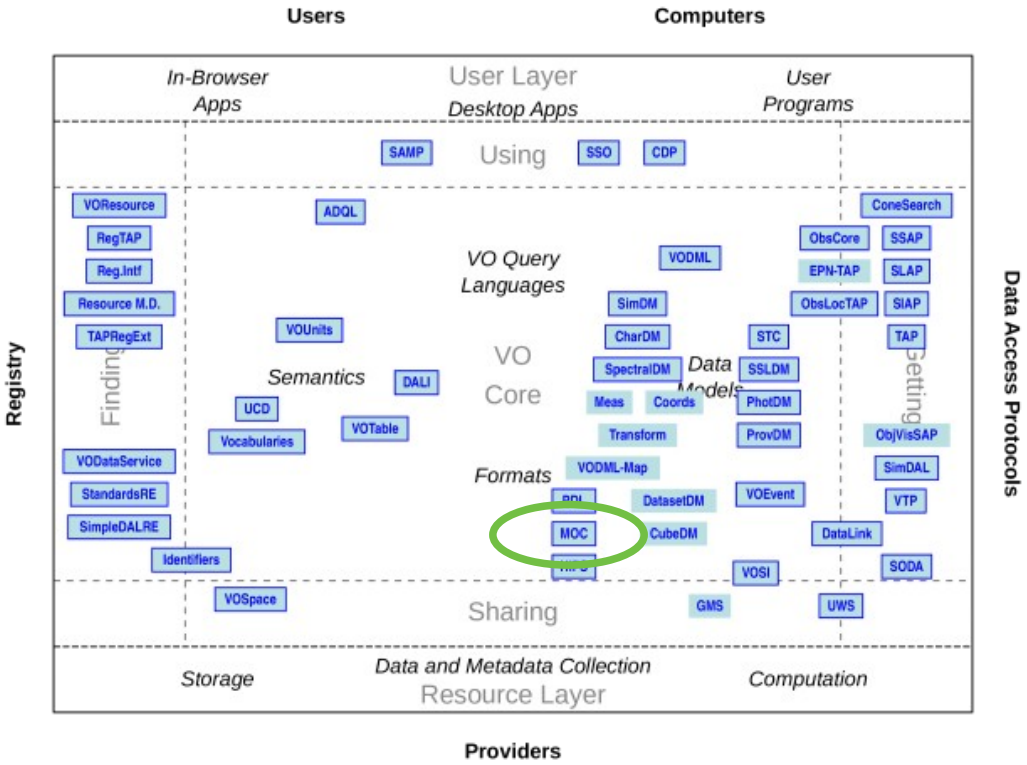
HiPS - Hierarchical Progressive Survey



- **HiPS images: RGB Coadded images**
- **HiPS catalogues: Dual Catalogues data**
- Version: HiPS 1.0
- One HiPS images and HiPS catalogue services by survey and DR
- Extension: hips_order_min

CEFCA Catalogues Portal: VO Services

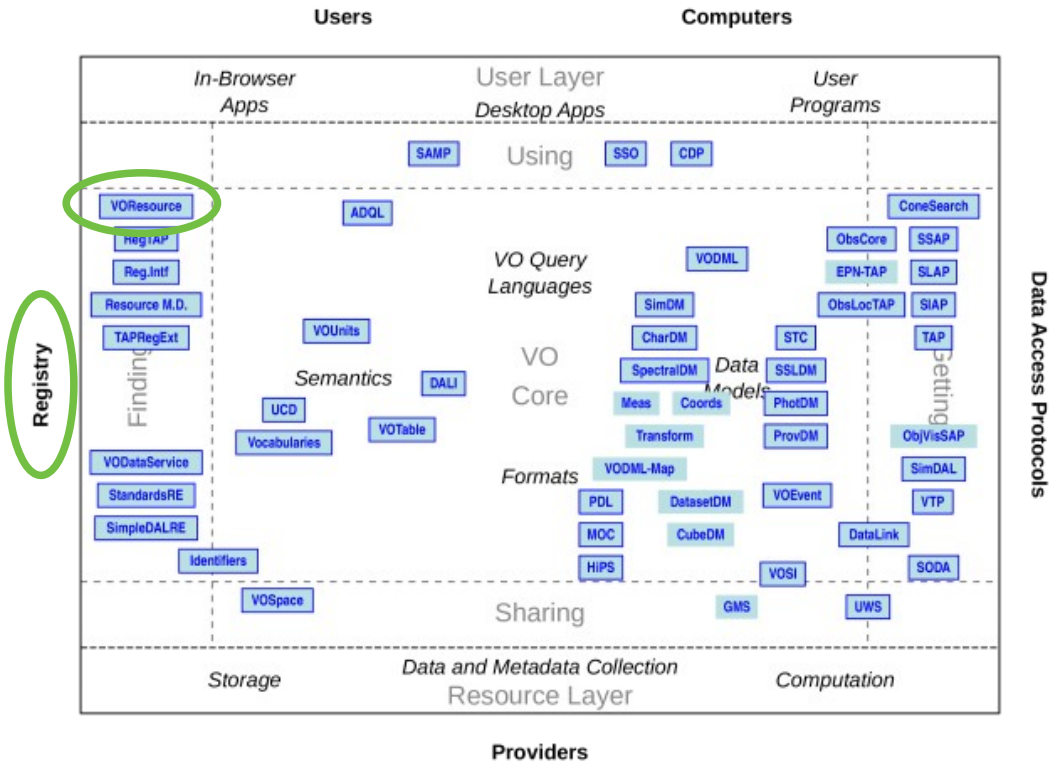
MOC - Multi-Order Coverage Map



- To represent **DR covered area**
- Version: MOC 1.1
- One MOC file by survey and DR

CEFCA Catalogues Portal: VO Services

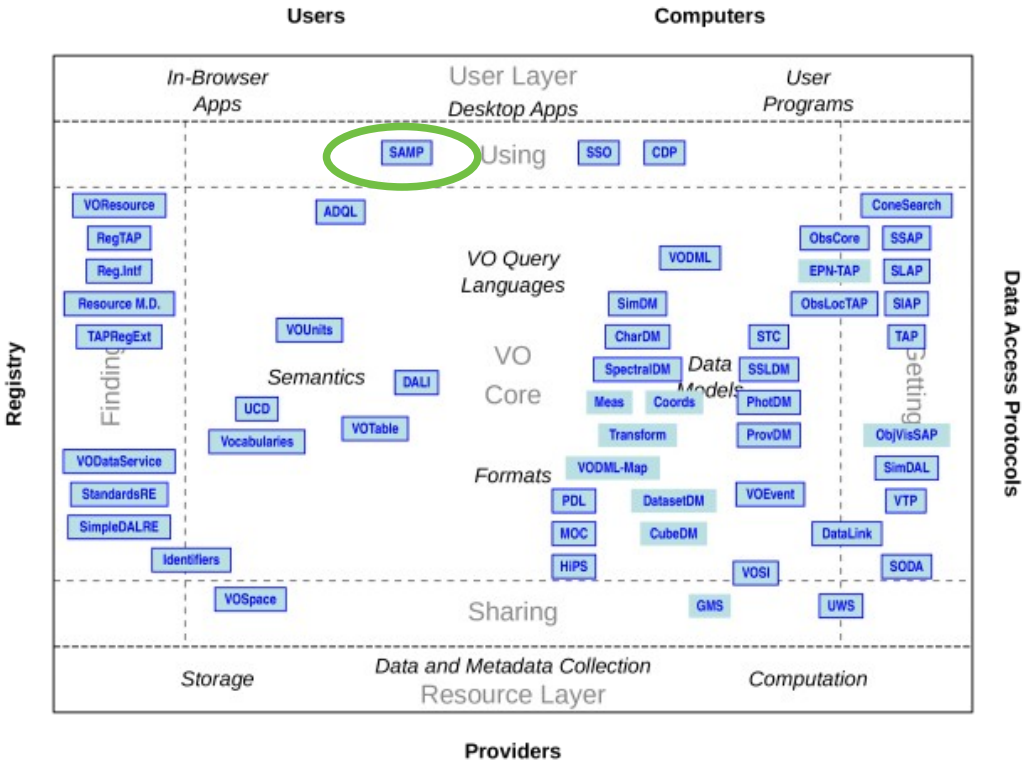
Registry: CEFCA Publishing Registry



- **One resource by survey and DR**
  - With all the VO Services availables for it: TAP, SIAP, SCS, HiPS, MOC
- Currently 3 resources

CEFCA Catalogues Portal: VO Services

SAMP – Simple Application Messaging Protocol



- To **transfer data** from our web portal services to VO compliant apps
- Version: SAMP 1.3

Transfer data

CEFCA Catalogues Portal: Implementation details

- **Public and Private DRs**
  - Basic HTTP Authentication

- **Implemented at CEFCA:**
  - Python (pyramid framework) + PostgreSQL

Lessons learned and future work

- Importance of **offering our data through VO services**
- Sometimes it is **difficult to know if you are correctly interpreting** the **protocol**
  - Very useful: study other observatories implementations
- Importance of **validate your services using external validators**
  - Very useful to check and improve the services
- Importance of **attending IVOA meetings** and related meetings

CEFCA
FONDO DE INVERSIONES DE TERUEL
GOBIERNO DE ARAGON
GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN
UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
"Una manera de hacer Europa"
IVOA

Lessons learned and future work

- **FUTURE WORK**
  - Continue **improving and working in our VO services**
  - Implement **SSAP** to offer our **photo-spectra**
  - Offer **Open time data** through **VO services**
    - **Time-domain data** projects

CEFCA
FONDO DE INVERSIONES DE TERUEL
GOBIERNO DE ARAGON
GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN
UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
"Una manera de hacer Europa"
IVOA

CEFCA
FONDO DE INVERSIONES DE TERUEL
GOBIERNO DE ARAGON
GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN
UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
"Una manera de hacer Europa"
IVOA

THANK YOU!

CEFCA
FONDO DE INVERSIONES DE TERUEL
GOBIERNO DE ARAGON
GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN
UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
"Una manera de hacer Europa"
IVOA