



# The IVOA Architecture

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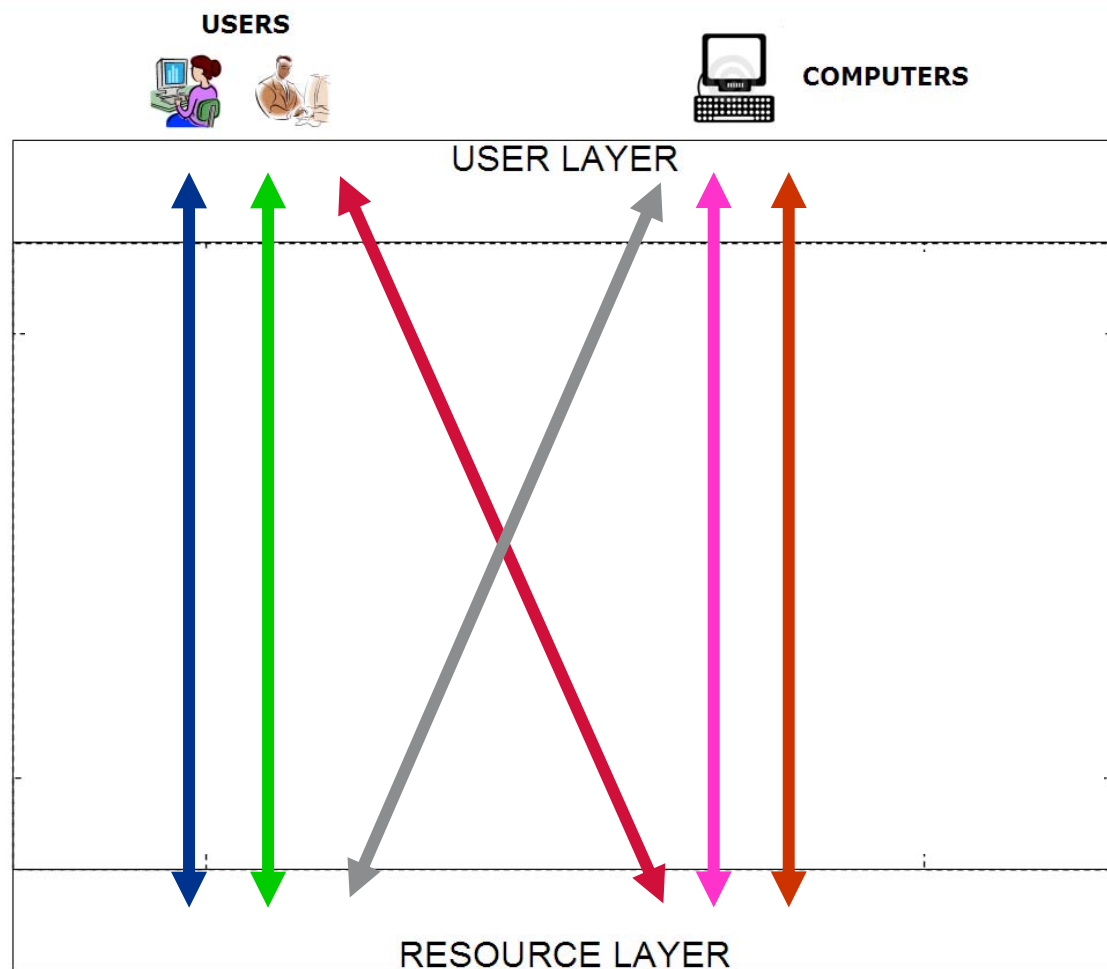
ADASS XXI, Paris, 8<sup>th</sup> November 2011



## 2 views required

- (level 0 and level 1) view for “public” consumption
  - Global, generic, minimize VO jargon
  - Readable by all, not too technical
  
- (level 2) view for IVOA and VO developers' needs
  - Extension of (level 1)
  - More detailed, all IVOA standards mentioned
  - Clear connections and inter-dependency between IVOA standards
  - Shows what is need to implement VO services
    - As a Data Centre, an Application developer, a Service Provider, ...
    - What building blocks are required to fulfill a science case

# Access to Astronomical Data and Services



20101004  
IVOA Architecture

**PROVIDERS**

- For each Archive and for each Service
  - Some common format (FITS)
  - Dedicated Data Model
  - Dedicated access interface
- No real inter operability between services

# IVOA Architecture – Level 0



**LEVEL 0**

**USERS**



**COMPUTERS**



**USER LAYER**

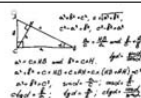


**RESOURCE LAYER**

20101004  
IVOA Architecture



**PROVIDERS**

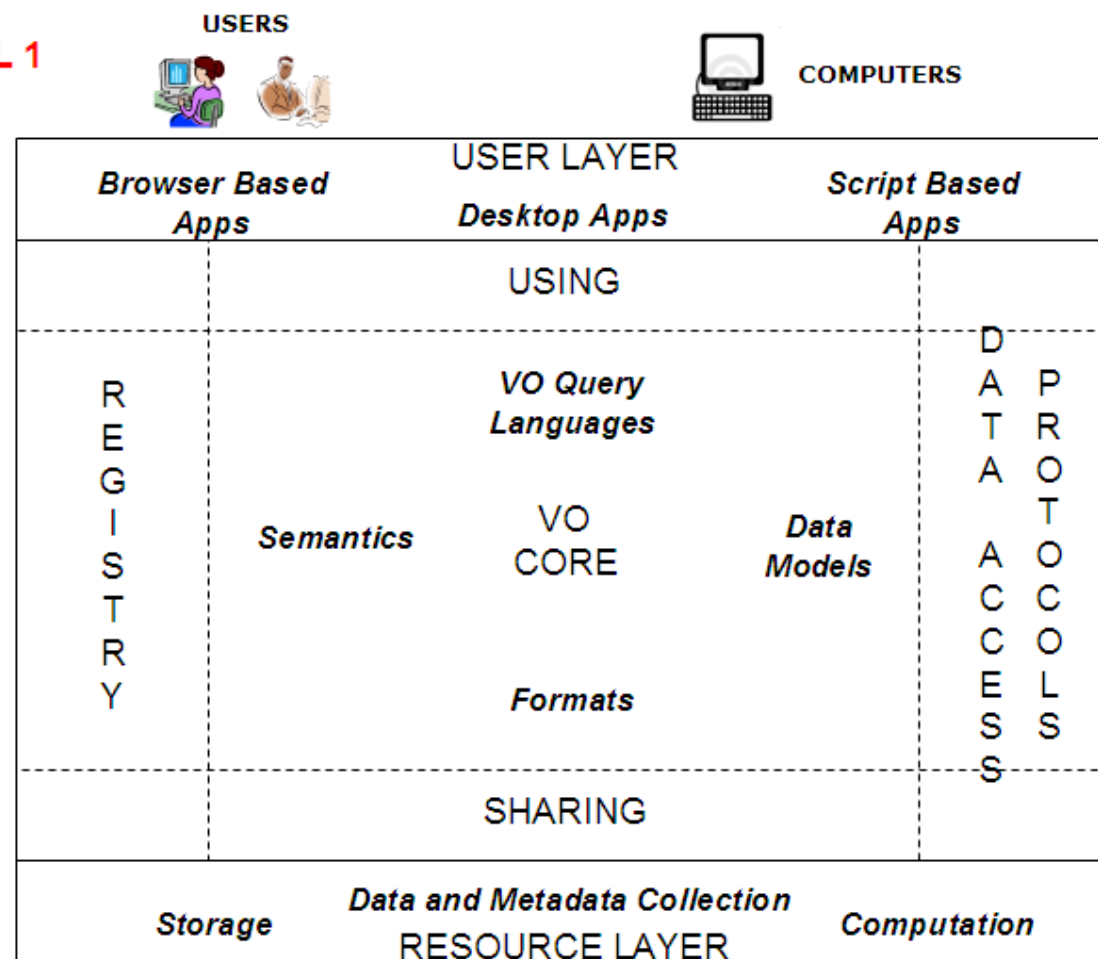


- Hide specificities of each Archive and each Service to offer a common framework for access and usage
- Yellow Page of Services
- Inter Operability between services

# IVOA Architecture – Level 1



**LEVEL 1**



20111027  
IVOA Architecture

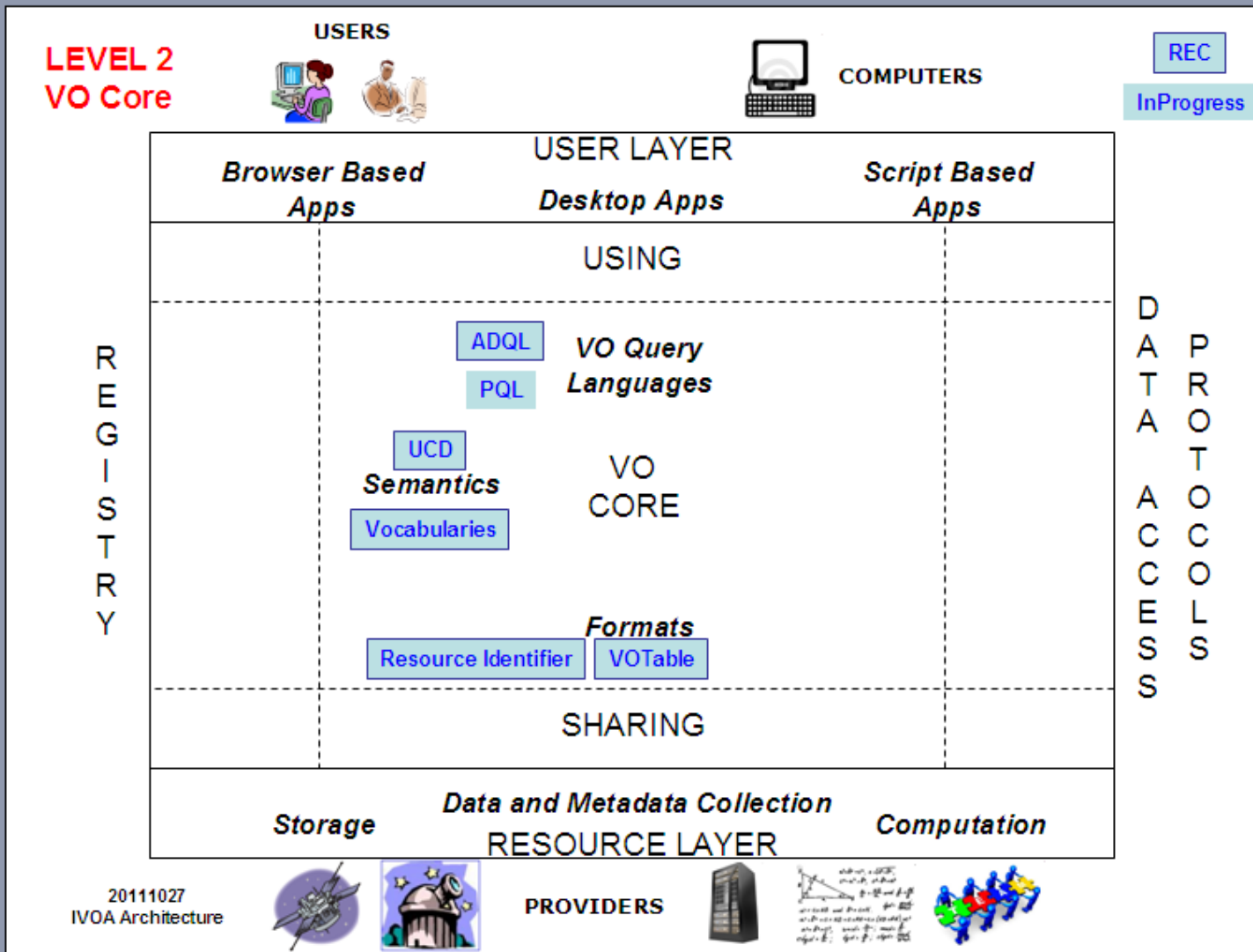


**PROVIDERS**



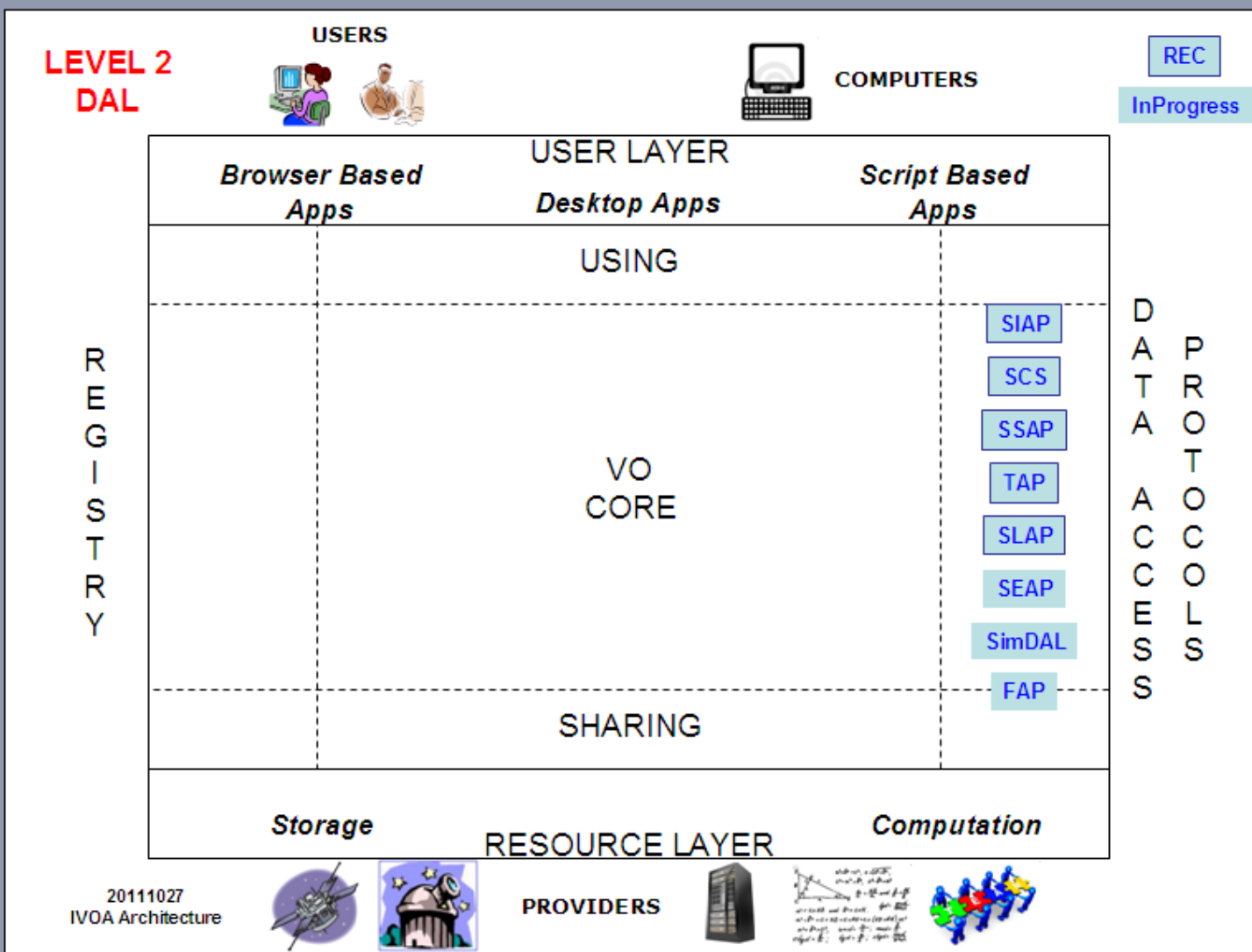
# IVOA Architecture – Level 2

## VO Core Protocols



- Underlying building blocks for other standards
- VOTable
  - 1<sup>st</sup> IVOA std and most used
- Unified Content Descriptor (UCD)
- Astronomical Data Query Language (ADQL)

# IVOA Architecture – Level 2 Data Access Protocols



## ➤ Simple Access Protocols

- Cone Search (SCS)
- Images (SIAP)
- Spectra (SSAP)
- Spectral Lines (SLAP)

## ➤ Table Access Protocol (TAP)

- More powerful
- TAP/ADQL + DM
- Table upload
- sync / async queries

# IVOA Architecture – Level 2 Data Models



**LEVEL 2  
DM all**



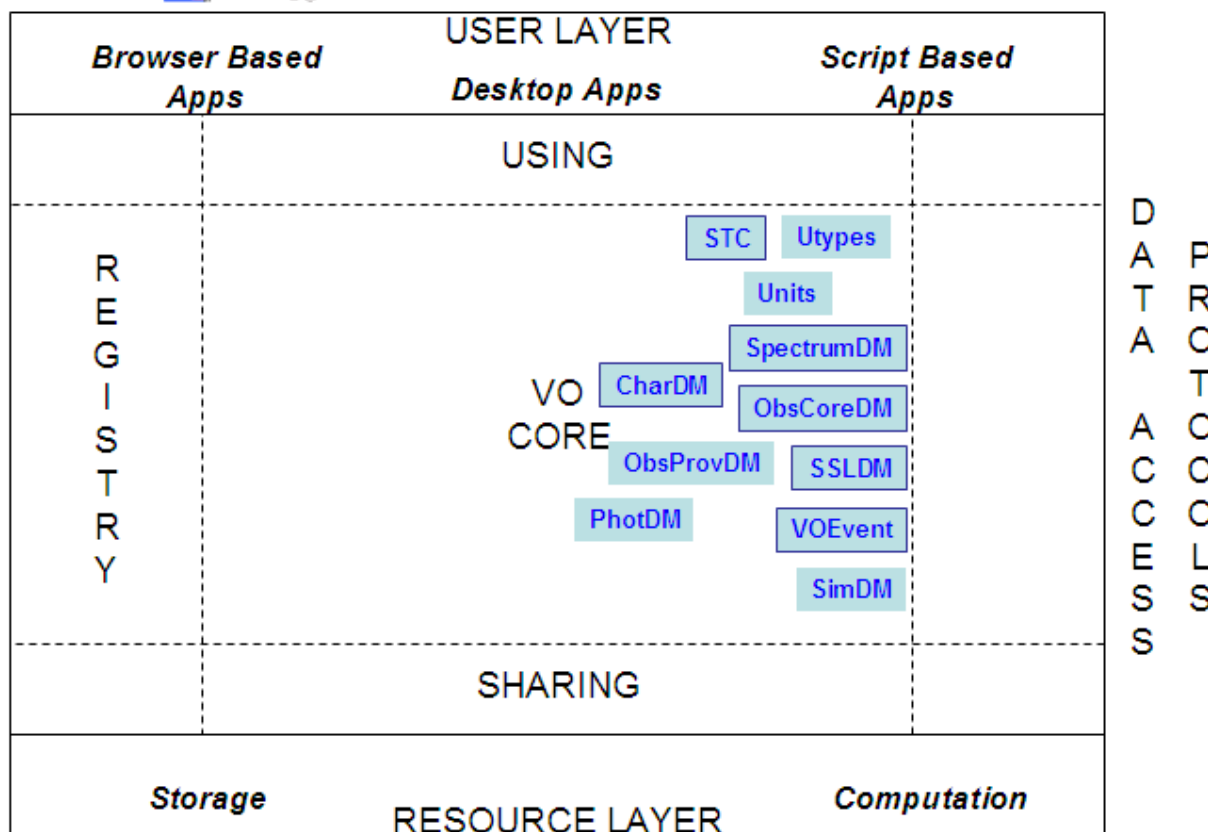
USERS



COMPUTERS

REC

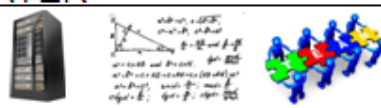
InProgress



- Core DM
  - STC, Utypes, Units, Characterization
- Type-specific DM
  - Observation Core
  - Spectrum
  - Simple Spectral Line
  - Photometry
- TAP/ADQL + DM
  - power and abstraction to access any data collection
- VOEvent

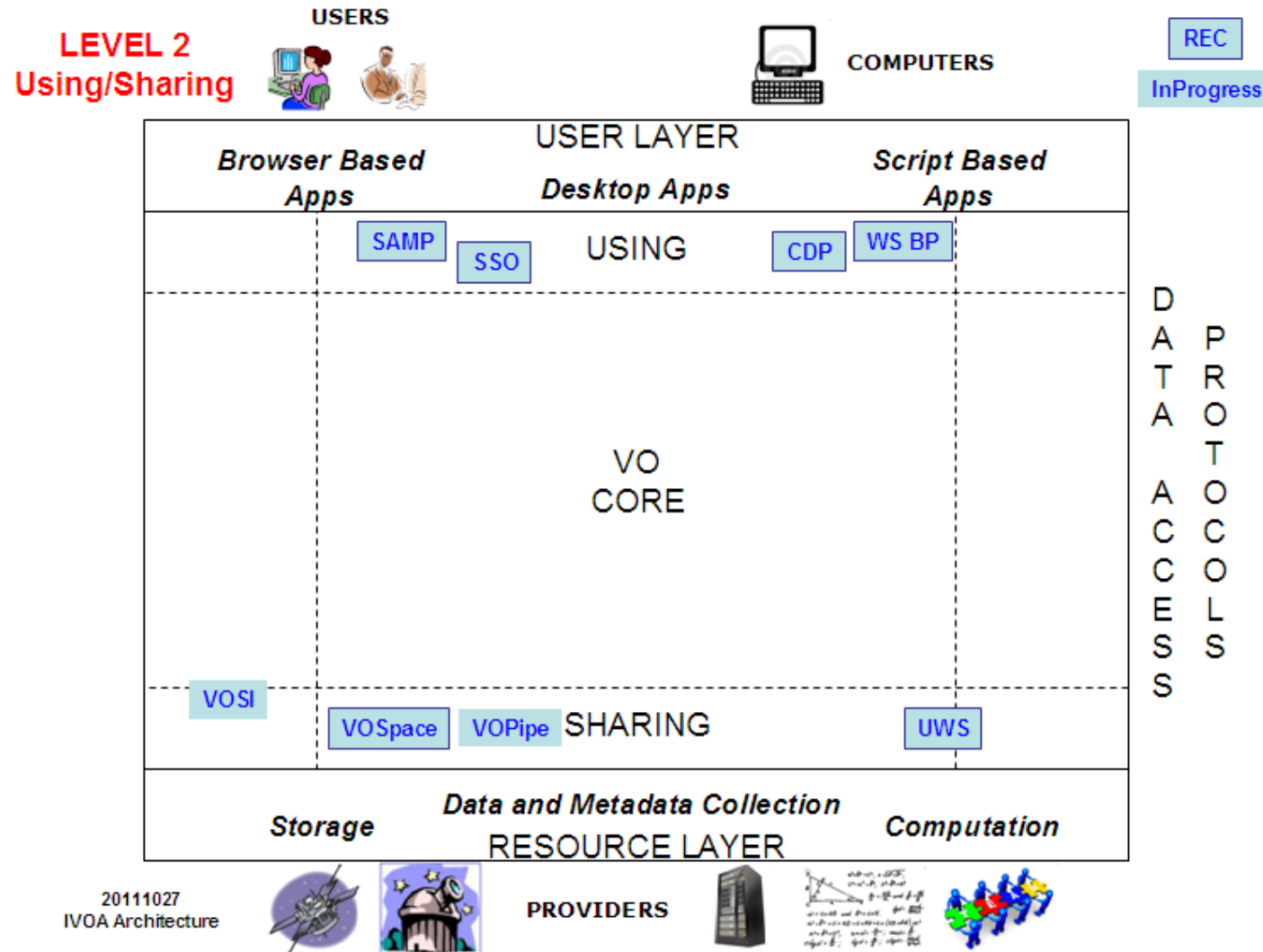


PROVIDERS



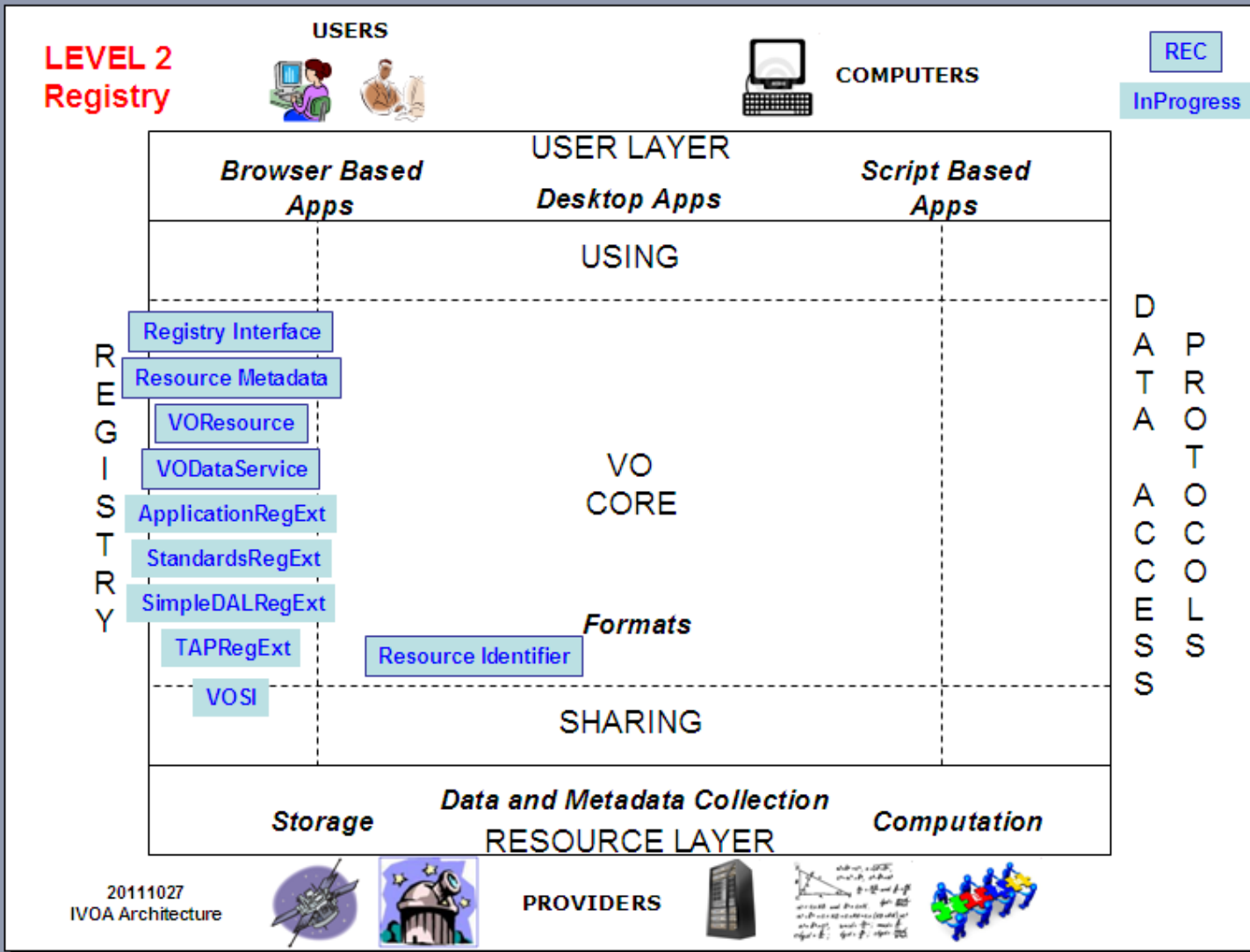


# IVOA Architecture – Level 2 Using and Sharing



- SAMP enabling inter connectivity between VO applications
- Single Sign On / Credential Delegation Protocol for user authentication
- VOSpace for VO virtual storage
- Others for VO data processing workflows

# IVOA Architecture – Level 2 Registry



- VO Yellow Page service
- Find VO Resources of different kinds
- Publishing Registries
- Full Searchable Registries
- Harvesting Registries

# IVOA Architecture – Level 2



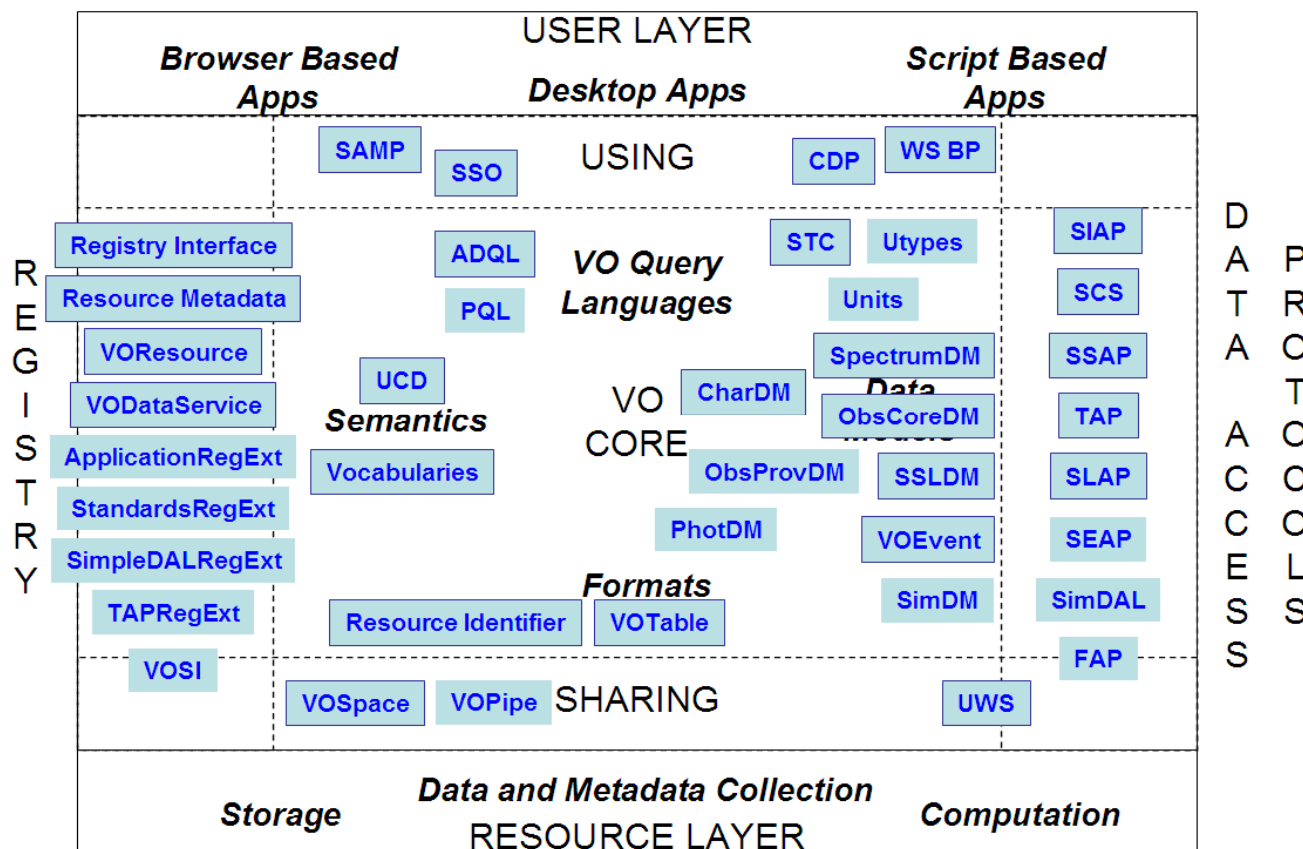
**LEVEL 2**  
All standards



COMPUTERS

REC

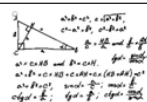
InProgress



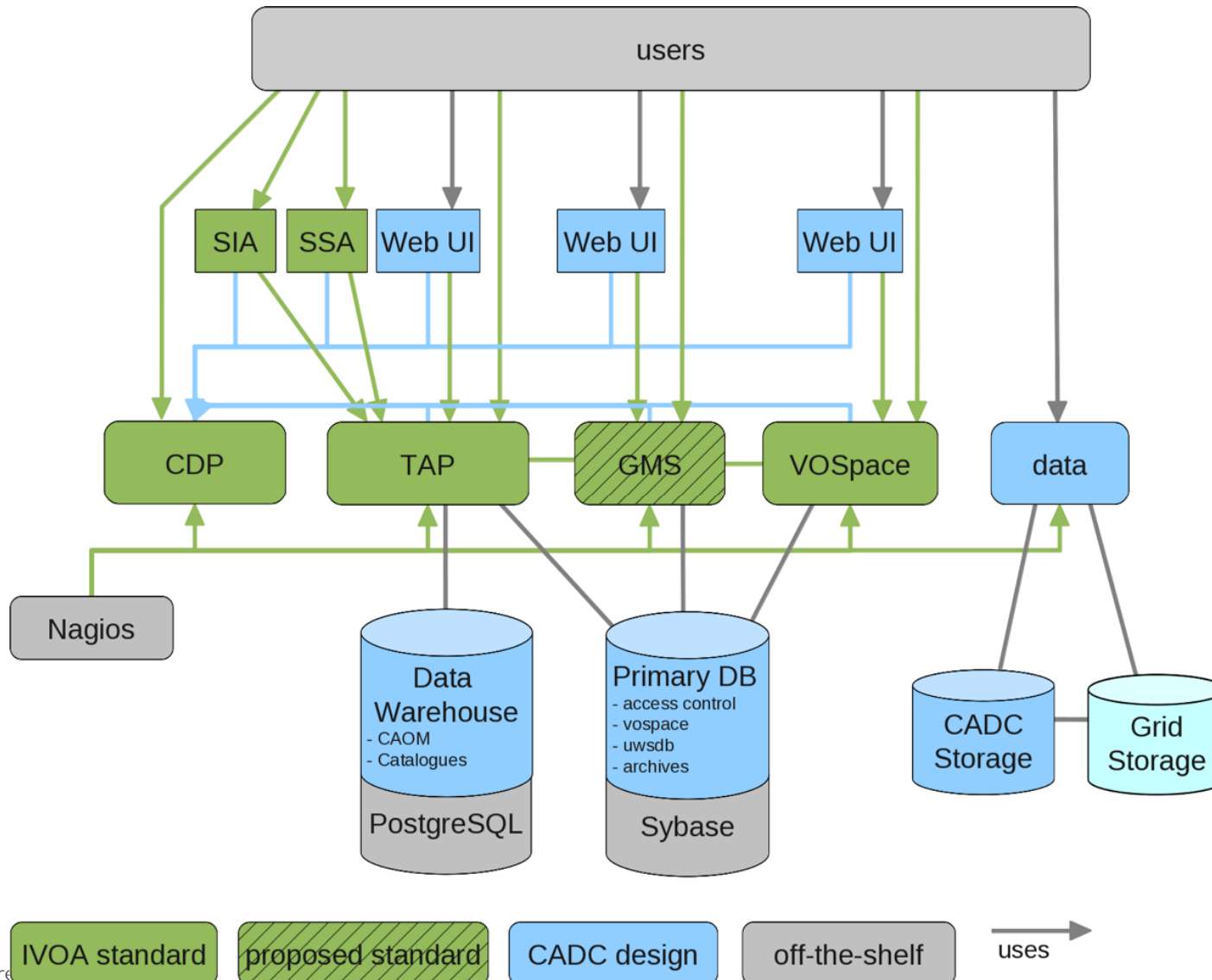
- All standards represent building blocks to be used depending of type of VO services
- Data & metadata VO Publishing
- VO Applications consuming VO services
- Processing and storage VO workflows



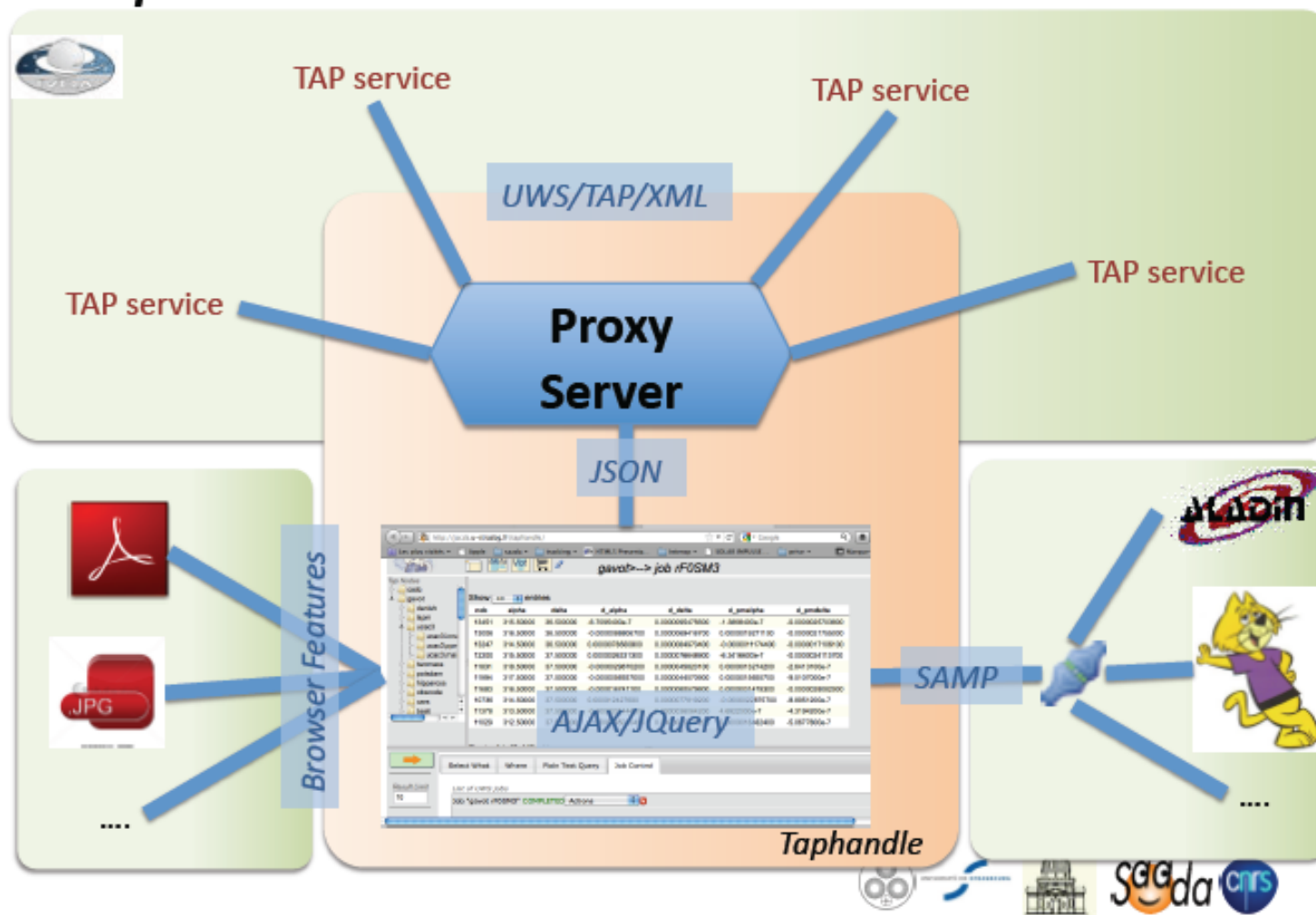
PROVIDERS



# CADC : a VO compliant infrastructure



## Taphandle Architecture



# TAP/ADQL/UWS in SIMBAD



## SIMBAD: TAP Service (TEST)

[CDS](#) · [Simbad](#) · [VizieR](#) · [Aladin](#) · [Catalogues](#) · [Nomenclature](#) · [Biblio](#) · [Tutorial](#) · [Developer's corner](#)

» TAP Service Login Preferences Register

### ADQL help

- [Simbad tables](#)
- [ADQL cheat sheet](#)

### Query examples

### Execution options

Job name:

Format:

Max records:

☒ Batch mode

☒ Check before start

### Upload (0)

Name	File/URL
Add table	

Note: to use an uploaded table in the query, you must prefix its name with TAP\_UPLOAD (i.e. TAP\_UPLOAD.myTable).

[Batch queries](#)

[Other TAP resources](#)

### SERVICE DESCRIPTION

TAP is an IVOA protocol which describes a way to query data tables of a service. Queries are by default written in ADQL and results are returned by default in VOTable. For more information about TAP see <http://www.ivoa.net/Documents/TAP/> and <http://www.ivoa.net/Documents/latest/ADQL.html> for ADQL.

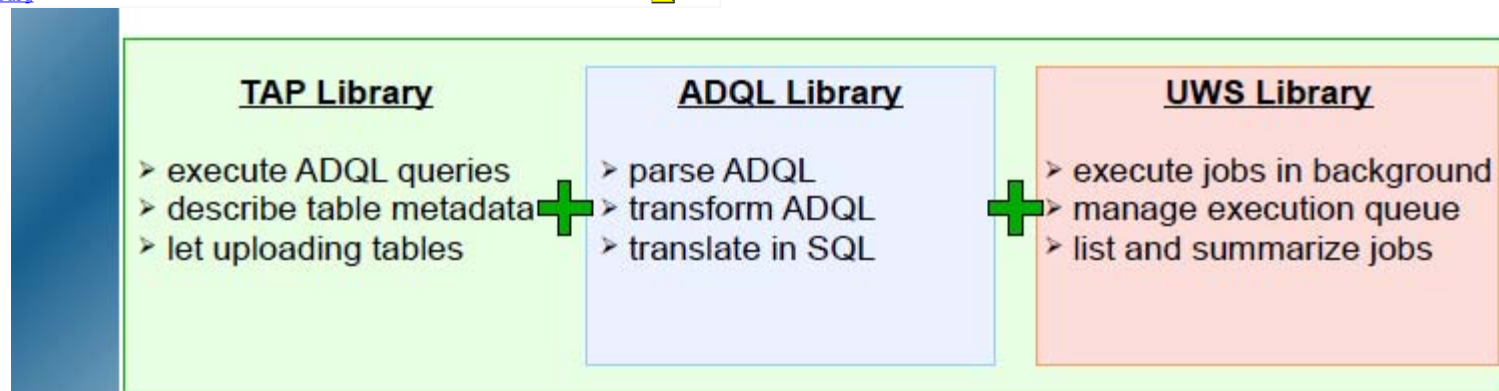
**NOTE:** This service is still in progress !

### EXECUTE A QUERY

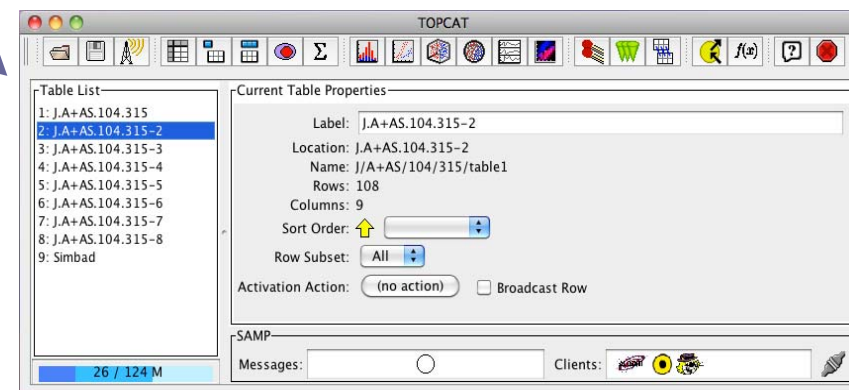
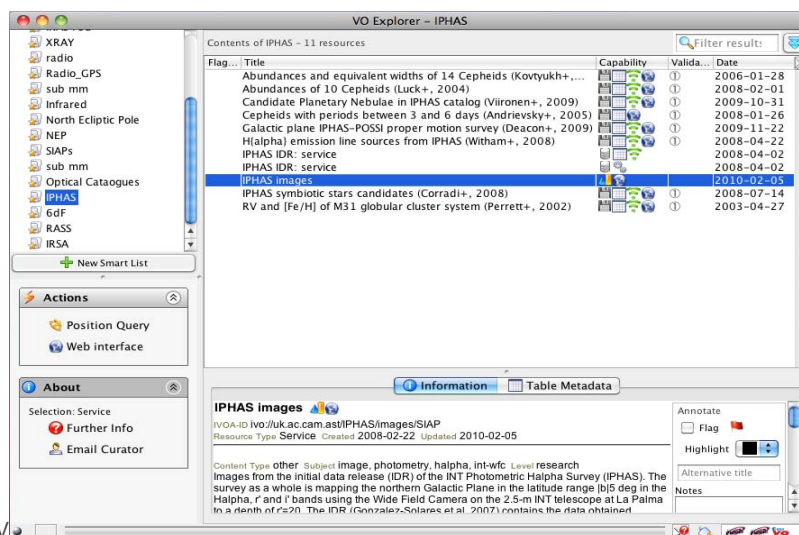
```
-- Display basic data about objects contained in a given circle and whose mag B < 9.0.
SELECT basic.OID,
       RA,
       DEC,
       main_id AS "Main identifier",
       coo_bibcode AS "BiblioReference",
       nbref AS "NbReferences",
       plx_value AS "Parallax",
       rvz_radvel AS "Radial velocity",
       galdis_majaxis,
       galdis_minaxis,
       galdis_angle AS "Galaxy ellipse angle"
FROM basic JOIN flux ON oidref = oid
WHERE filter = 'B'
AND flux < 9.0
AND CONTAINS(POINT('ICRS', RA, DEC), CIRCLE('ICRS', 10, 5, 1)) = 1
ORDER BY "Main identifier";
```

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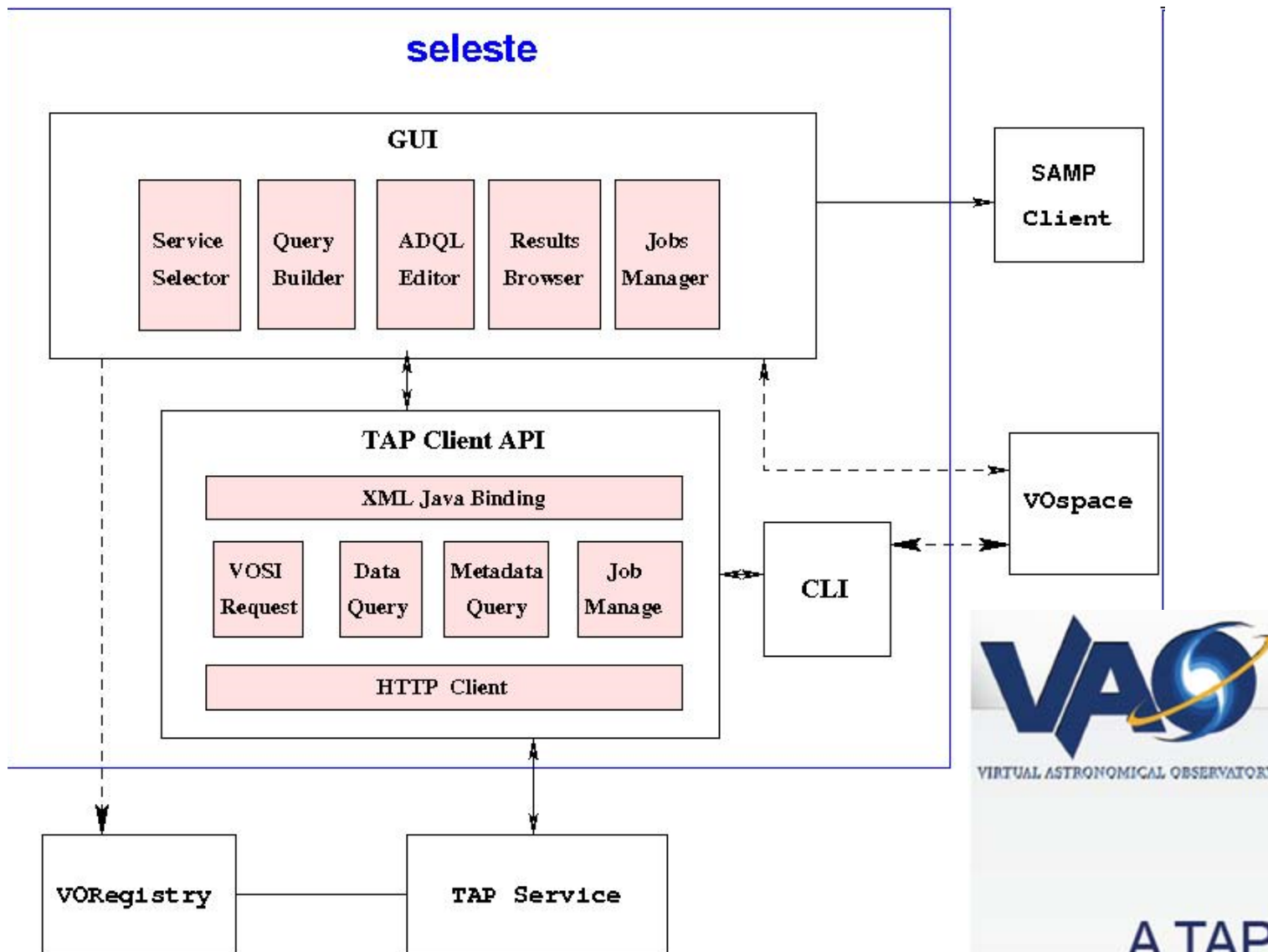
## TAP Usage in SIMBAD







# seleste : VAO TAP Client Application



**seleste**  
A TAP Client Application



# SAMP used in other discipline: Soho Science Archive and Aladin



SOHO Science Archive v1.6

File View Windows Actions Tools Help

Search Observations EIT #1

Observations

[ 69,871 Results ] Page 1 of 1,398 Page Size: 50

Instrument	Detector	Observation Type	Begin Date
EIT	EIT	SYNOPTIC FULL SUN	00:13:37 16/01/1996
EIT	EIT	SYNOPTIC FULL SUN	00:29:05 16/01/1996
EIT	EIT	SYNOPTIC FULL SUN	00:52:45 16/01/1996
EIT	EIT	SYNOPTIC FULL SUN	13:54:59 16/01/1996
EIT	EIT	SYNOPTIC FULL SUN	16:34:09 18/01/1996
EIT	EIT	SYNOPTIC FULL SUN	17:49:26 19/01/1996
EIT	EIT	SYNOPTIC FULL SUN	18:41:02 19/01/1996
EIT	EIT	SYNOPTIC FULL SUN	21:19:38 19/01/1996
EIT	EIT	SYNOPTIC FULL SUN	21:31:26 19/01/1996
EIT	EIT	SYNOPTIC FULL SUN	21:38:47 19/01/1996
EIT	EIT	SYNOPTIC FULL SUN	16:29:59 20/01/1996
EIT	EIT	SYNOPTIC FULL SUN	17:05:58 20/01/1996
EIT	EIT	SYNOPTIC FULL SUN	17:44:09 20/01/1996
EIT	EIT	SYNOPTIC FULL SUN	18:15:58 20/01/1996
EIT	EIT	SYNOPTIC FULL SUN	18:54:32 20/01/1996
EIT	EIT	SYNOPTIC FULL SUN	19:48:45 21/01/1996

Log Console

posuna has logged in at 1:52:00 PM

Details

Eit Obs Details [1169870]

Id: 1169870

Instrument: EIT

Observatory: SOHO

Detector: EIT

Obs Type: SYNOPTIC FULL SUN

Object: Full Sun/Full Disk

Objective: SYNOPTIC FULL SUN

Proc Level: LZ file

Begin Date: 07:29:33 06/05/1996

End Date: 07:29:40 06/05/1996

File Name: eiz19960506.072933

File Format: FITS

File Size: 2108160 bytes

Wave Range: 171 Angstrom

Obs Name: 171\_SEC.000

Obs Mode: backside

Fov Position: 0.00,0.00 arcsec

Fov Angle: -0.31 degrees

Fov Size: [1024],[1024] arcsec

Spatial Res: 2.629 arcsec

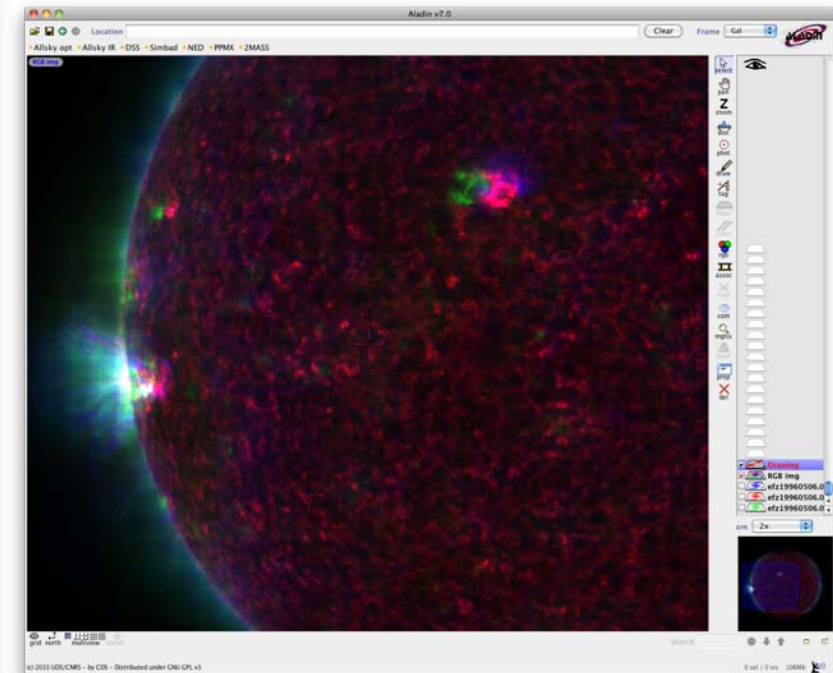
Exp Count: 1

Exp Time: 7.100 seconds

Origin: Rocket Science

Wave List: N/A Angstrom

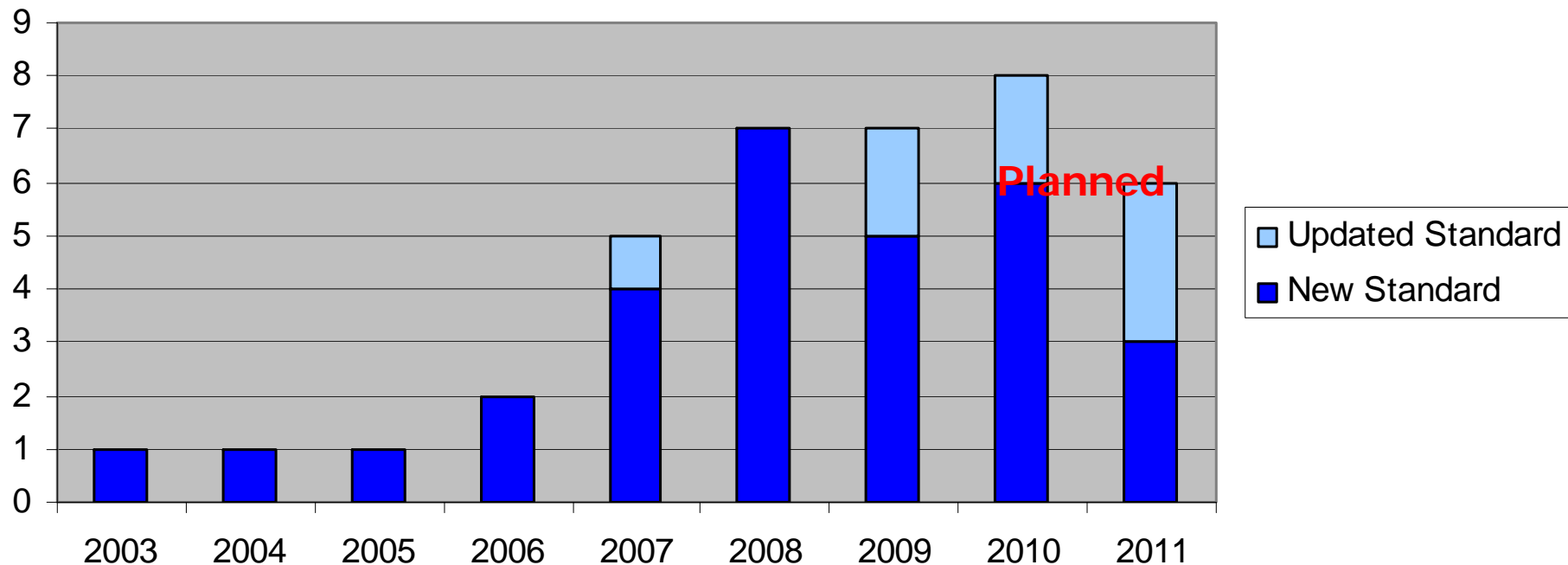
19960506\_0729\_eit171\_1024.jpg



# IVOA standards release through time



IVOA Standards issued per year



30 endorsed standards  
<http://www.ivoa.net/Documents/>

# Reference and acknowledgements



- The IVOA Architecture (Oct 2010)
  - <http://www.ivoa.net/Documents/Notes/IVOAArchitecture/>
- Stable since 1<sup>st</sup> version (Oct. 2010)
- Update foreseen in 2012
- Thanks to all the people who have participated to the definition and the writing of IVOA standards
- Thanks to all the people who are developing VO services and applications



*International  
Virtual  
Observatory  
Alliance*

## IVOA Architecture

### Version 1.0

**IVOA Note 2010-11-23**

#### **This version:**

Version 1.0- 23<sup>rd</sup> of November 2010

#### **Latest versions:**

#### **Previous version(s):**

#### **Editors**

Christophe Arviset

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