CDS and the VO

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CDS Council -- 19 September 2012

Virtual Observatory

- Framework for interoperable and efficient access to astronomical data and services
- e-Science for Astronomy
- Based on global standards
  - co-ordination via IVOA

Vision

- Archives and databases form a ‘digital sky’
- New possibilities via data discovery, efficient data access and interoperability

Driven by:

- Exploding data rates
- Multi-λ, time-domain & survey science
- Astronomers demand/expectation of interoperability

CDS involvement

- Development of VO standards
- Leadership roles in IVOA, EuroVO, VOFrance
- CDS services a major building block of VO
- VO science tools and services
- Science tutorials, outreach/education
- VO software libraries (UWS, TAP,...)

CDS approach to VO

- Participate fully in VO development of standards -- it improves the CDS services
- Helping the community to become interoperable raises the global level, and increases use of CDS services
- Implementation of VO in CDS services alongside other access modes
- Use VO to foster more innovation and collaboration

Projects

- EURO-VO European co-ordination
  - **AVO** (FP5)
  - **VOTech** (FP6)
  - **EuroVO-DCA** (FP6)
  - **EuroVO-AIDA** (FP7)
  - **EuroVO-ICE** (FP7)
  - **CoSADIE** (FP7) *Sept 2012 - Aug 2014*

IVOA

- Leadership roles: *current

Genova - Chair 2006-7, Vice-Chair 2005-6, DCP IG Vice chair 2004-7, Comm. Standards and Processes 2007-

Ochsenbein - VOTable Chair 2003-9

Fernique - Applications WG Vice-Chair 2011-

Allen - Applications IG/WG Chair 2005-8, Comm. Science Priorities 2009-, Newsletter Editor, Secretary 2009-

Derriere - Semantics WG Chair 2008-12

Schaaff - Grid and Web Services WG Vice Chair 2011-

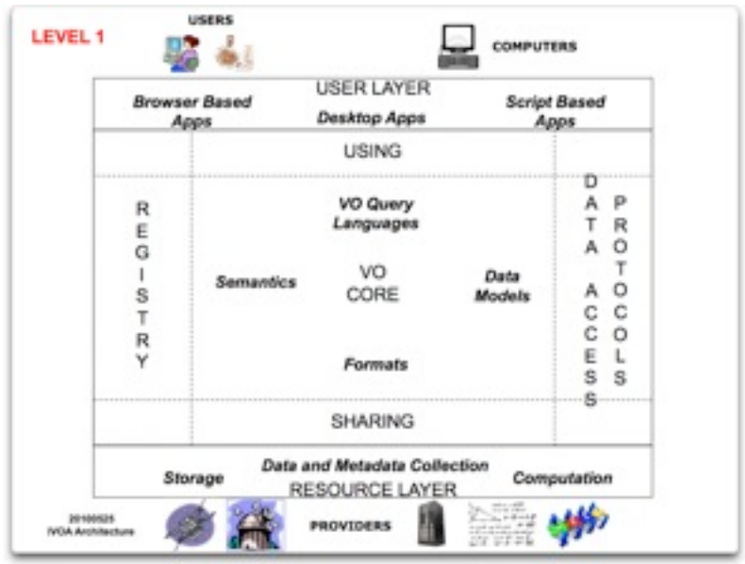
Preite-Martinez (INAF) - Semantics WG Chair 2005-8

Louys (LSIIT) - Data Models WG Chair 2007-11, Semantics WG Vice-Chair 2011-

Wozniak (Obs. Strasbg.) - Theory WG Chair 2008-11

IVOA Improved:

- Architecture
- Technical Assessment and Roadmap
- Science Priorities



- Standards documents available via arXiv.org

IVOA Challenged:

- reduced resources across most member VO projects

Specific CDS contributions to IVOA standards

- VOTable
- Data Access Layer
  - Simple Spectral Access (SSA), Simple Image Access (SIA), Table Access Protocol (TAP)
- Data models: Characterisation, ObsTAP, Spectrum, Simulation, Photometry
- Applications: SAMP
- GWS: VOSpace 2.0, Basic Profiles
- Semantics: UCDs, Units

see the list of IVOA standards 'signed' by CDS members **(most recent)*

Technical Specifications

Group	Title	Most stable	In progress	Versi
App	Simple Application Messaging Protocol	1.3		1.3 1.3 1.3 |1.3| |1.3| 1.2 1.2 1.2 1.11 1.11 1.10
DAL	Data Access Layer Interface	1.0		1.0
	Simple Cone Search	1.03		1.03 1.02 1.01 1.00
	Simple Image Access	1.0		1.0 1.0 1.0 1.01 1.00
	Simple Line Access	1.0		1.0 1.0 1.0 1.0 1.0 1.0
	Simple Spectral Access	1.1		1.1 1.1 1.1 1.1 1.04 1.03 1.02 1.01 1.01 1.00
	Table Access Protocol	1.0		1.0 1.0 1.0 1.0 1.0 1.00
	TAPRegExt: a VOResource Schema Extension for Describing TAP Services	1.0	|RFC|	1.0 1.0 1.0 1.0 1.0 1.0
	IVOA Astronomical Data Query Language	2.00		2.00 2.00 2.00 1.01 1.00
	IVOA SkyNode Interface	1.01		1.01 1.00
DaM	Photometry DM	1.0	|RFC|	1.0 1.0 1.0 1.0 |1.0|
	Simulation Data Model	1.0		1.0 1.0 1.0 1.0 1.0 1.0
	Space-Time Coordinate Metadata for the Virtual Observatory (STC)	1.33		1.33 1.31 1.30 1.21 1.20 1.10 1.00
	Data Model for Astronomical DataSet Characterisation	1.13		1.13 1.12 1.12 1.11 1.10 1.00
	Simple Spectral Lines Data Model	1.0		1.0 1.0 1.0 1.0 1.0
	IVOA Spectrum Data Model	1.1		1.1 1.1 1.1 1.03 1.02 1.01 1.01 1.01 1.00
	Observation Data Model Core Components and its Implementation in the Table Access Protocol	1.0		1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
GWS	Parameter Description Language		|0.1|	|0.1|
	IVOA Single-Sign-On Profile: Authentication Mechanisms	1.01		1.01 1.01 1.00 1.00
	VOSpace service specification	1.15	|RFC|	2.0 2.0 2.0 2.0 2.0 2.0 1.15 2.0 1.15 1.15 1.1
	IVOA Credential Delegation Protocol	1.0		1.0 1.0 1.01 1.01 1.00
	Universal Worker Service	1.0		1.0 1.0 1.0 1.0 1.0 1.0
	IVOA Support Interfaces	1.0		1.0 1.0 1.0 1.0 1.0 1.0
	IVOA Web Service Basic Profile	1.0		1.0 1.0 1.0 1.0 1.0
ReR	Describing Simple Data Access Services	1.0	1.0	1.0
	IVOA Identifiers	1.12		1.12 1.11 1.10 1.10 1.10 1.00
	IVOA Registry Interfaces	1.0		1.0 1.0 1.00 1.02 1.01 1.00
	Resource Metadata for the Virtual Observatory	1.12		1.12 1.12 1.10 1.10 1.01 1.01 1.00 1.00
	StandardsRegExt: a VOResource Schema Extension for Describing IVOA Standards	1.0		1.0 1.0 1.0 1.0 1.0 1.0 1.0
	SimpleDALRegExt: Describing Simple Data Access Services	1.0	|RFC|	1.0 1.0
	VOResource: an XML Encoding Schema for Resource Metadata	1.03		1.03 1.02 1.02 1.01 1.00
	VODataService: a VOResource Schema Extension for Describing Collections and Services	1.1		1.1 1.1 1.1 1.1 1.1 1.10
Semantics	Units in the VO	1.0	|RFC|	1.0 1.0 1.0
	An IVOA standard for Unified Content Descriptors	1.10		1.10 1.10 1.06 1.05 1.03
	UCD1+ Controlled Vocabulary	1.23		1.23 1.22 1.21 1.20 1.20 1.11 1.11 1.10 1.02 1
	Maintenance of the list of UCD words	1.20		1.20 1.20 1.10 1.00
	Vocabularies in the Virtual Observatory	1.19		1.19 1.18 1.16 1.15 1.13 1.00
SDP	IVOA Document Standards	1.2		1.2 1.2 1.2 1.2 1.2 1.1 1.1 1.0 1.0
VOE	Sky Event Reporting Metadata (VOEvent)	2.0		2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.11 1.11 1.10
VOT	VOTable Format Specification	1.2		1.2 1.2 1.2 1.20 1.20 1.10 1.00

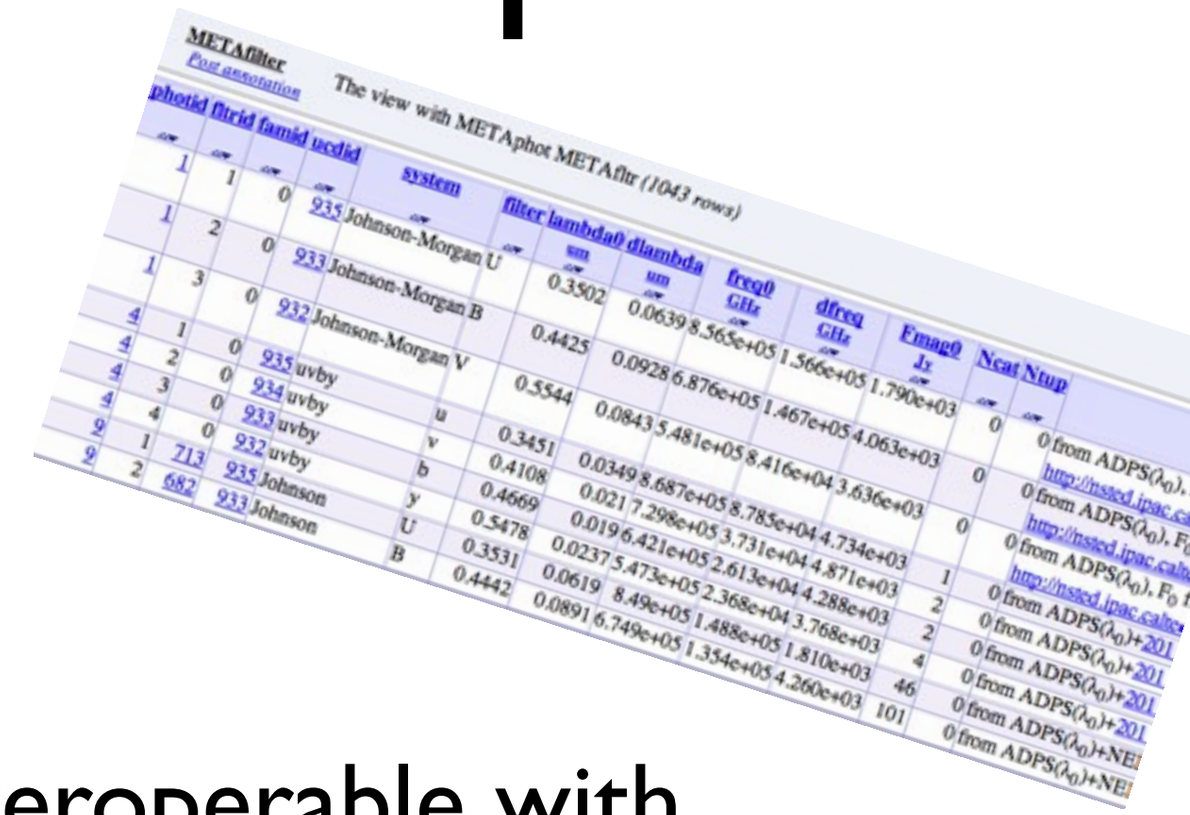
Maturity level: Recommendation Proposed Recommendation Working Draft

Most stable: New systems should be developed against this version with the highest maturity level.

VO in CDS services

- VO compliance in services
  - Significant improvements in VO access alongside existing modes (Vizier/Simbad/Aladin)
- Aladin ‘VO Portal’
- VO interoperability of tools (SAMP)
- Innovation (e.g. MOC, Cross-Match)

Vizier SED example



Photometry metadata

\+ Standard services

➡ Vizier photometry interoperable with others (NED), and useable in VAO SED tool ‘Iris’

Iris

Load File

SED Builder

SED Viewer

Fitting Tool

SED Builder

SED: New Remove Save Duplicate Broadcast

Open SEDs

Vizier (Segments: 53)

Sed0 (Segments: 1)

Selected SED

ID: Vizier

Target Name: NED Names Resolve RA: DEC:

Segments: New Point Remove Save Edit

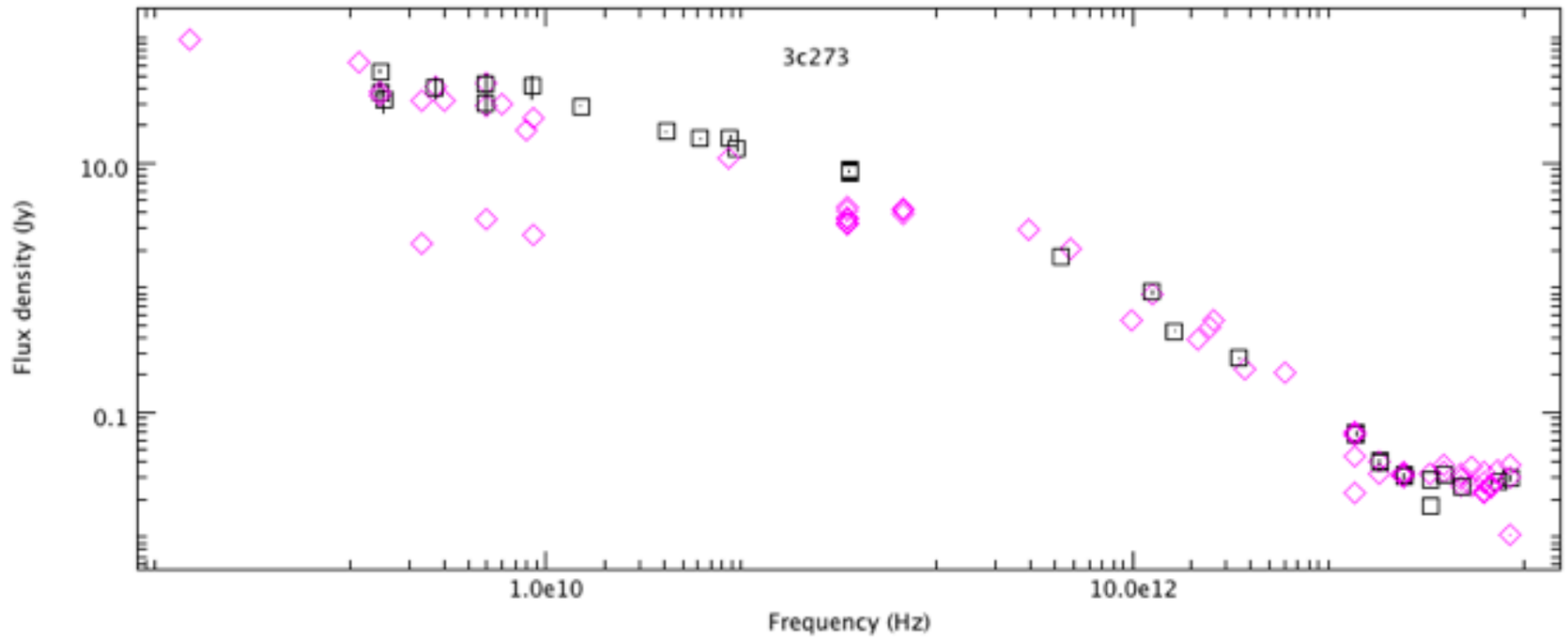
	Publisher
526	Vizier - CDS
523	Vizier - CDS
519	Vizier - CDS
53	Vizier - CDS
524	Vizier - CDS
524	Vizier - CDS
523	Vizier - CDS

Vizier

File

X axis: SpectralAxis Y axis: FluxAxis 6.3880204E10 1.3702725 Print Redraw

Grid off Auto Plot type Expand Metadata Flux density Units



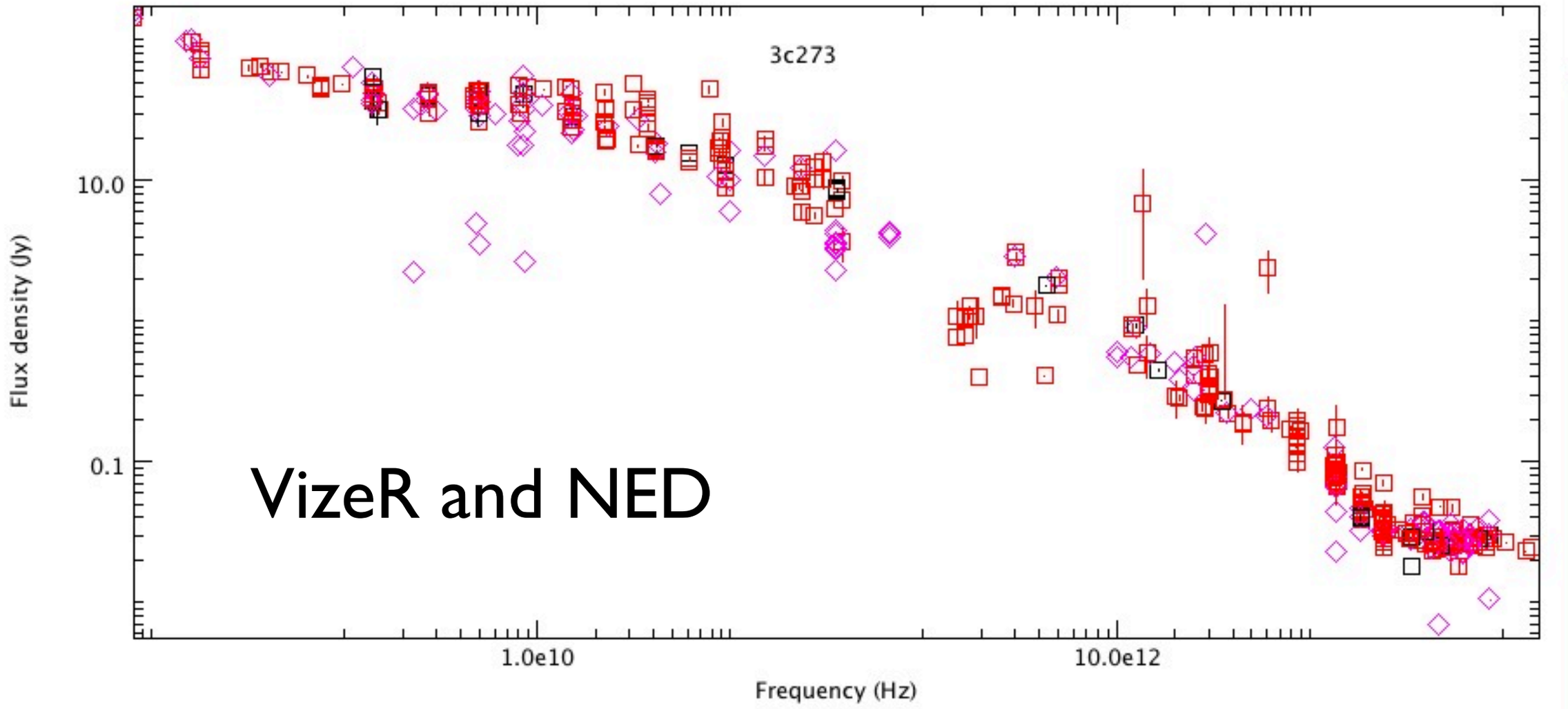
SAMP status

Vizier

File

X axis: SpectralAxis | Y axis: FluxAxis | 5.2494824E12 | 128.86371 | Print | Redraw

Grid off | Auto | Plot type | Expand | Metadata | Flux density | Units



VizeR and NED

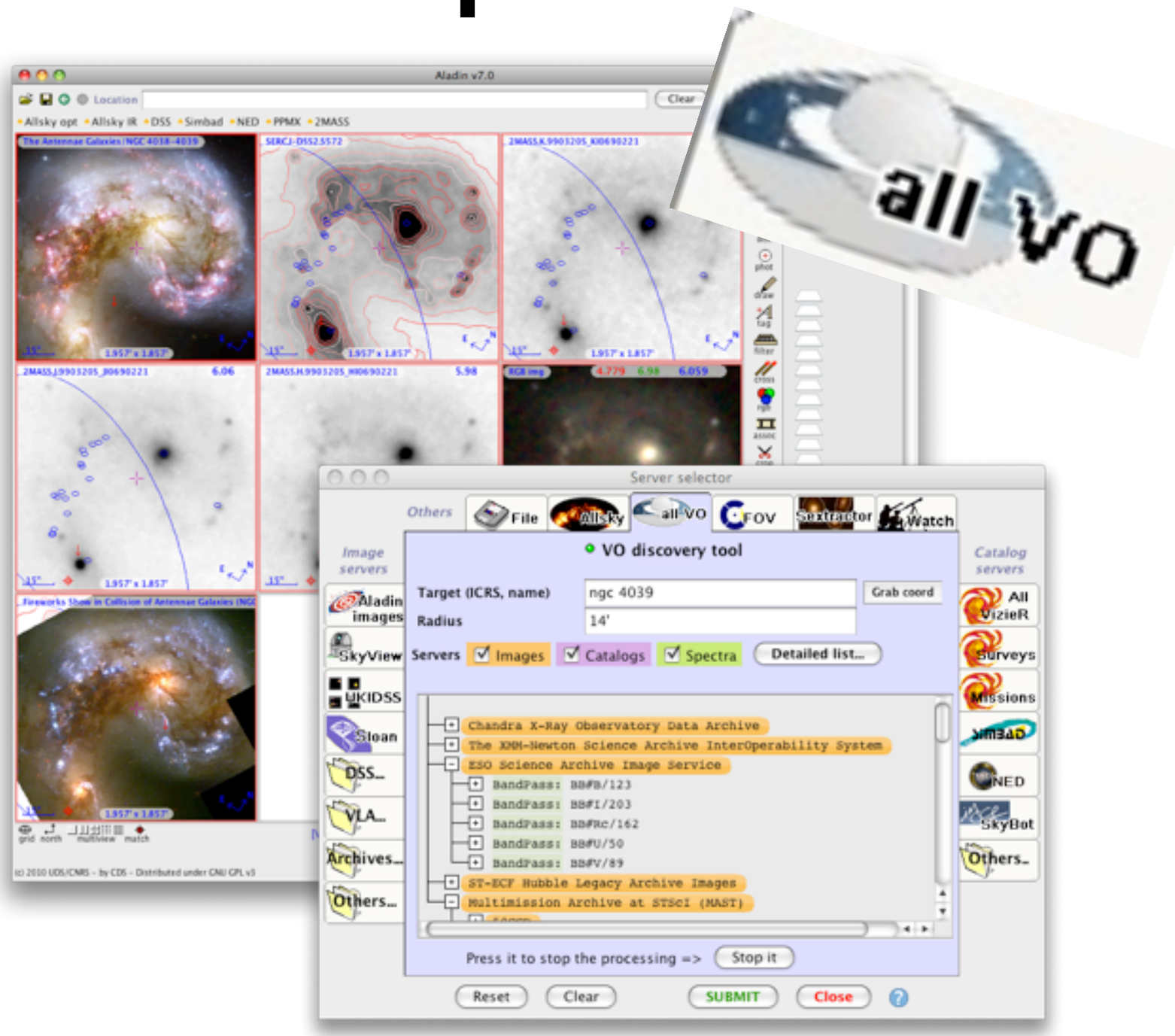
Simbad & VizieR TAP services

- ... can also be queried via Topcat

ALADIN as a VO portal

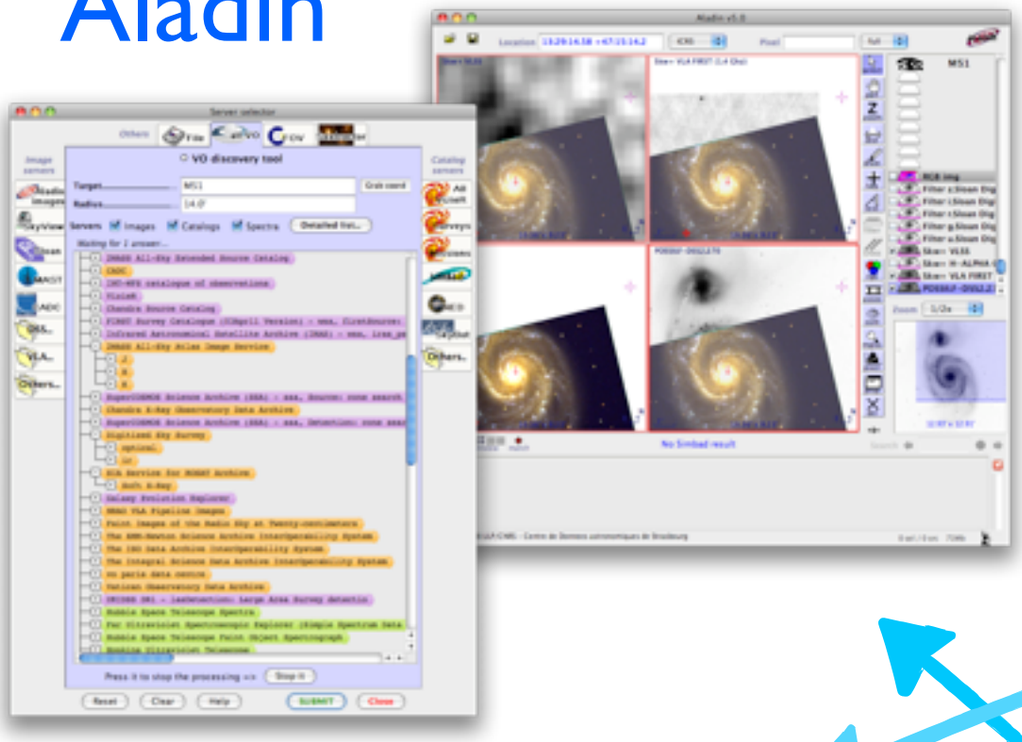
Interactive Sky Atlas

Images
Catalogues
VO Access
All Sky
Scripting + ...

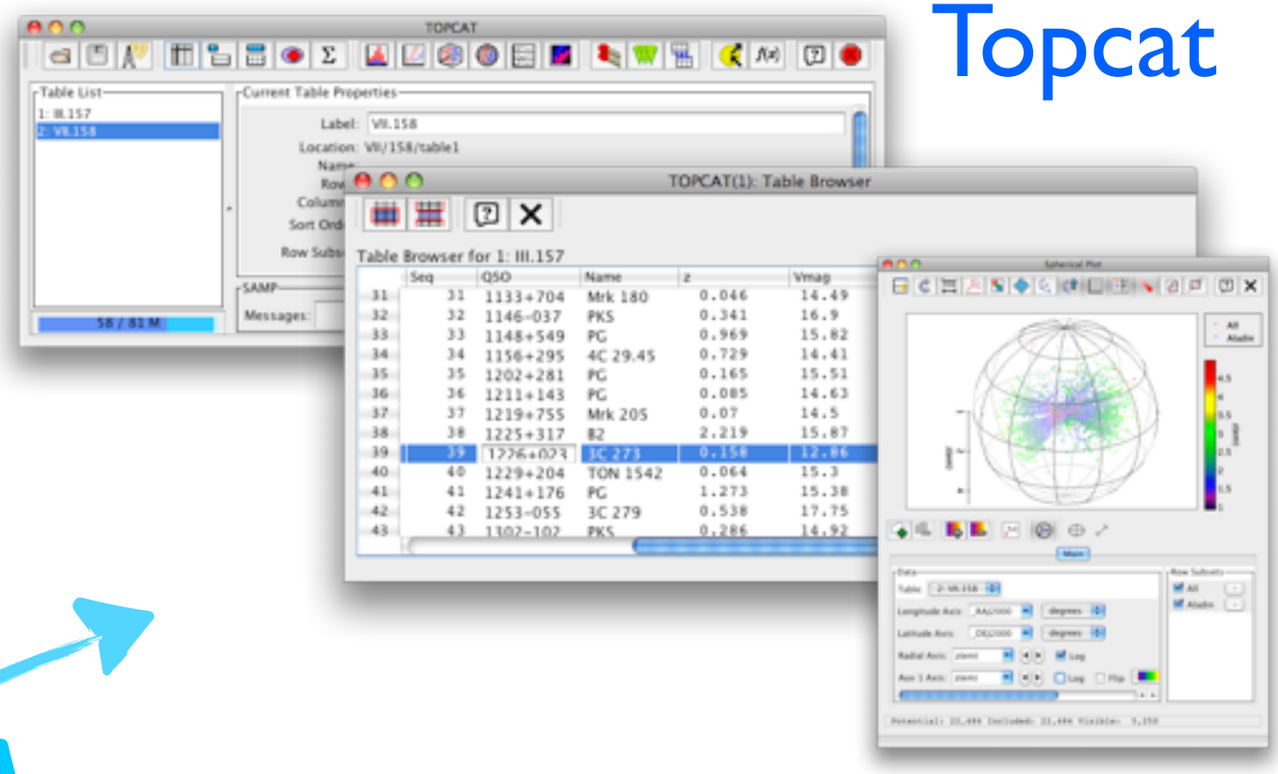


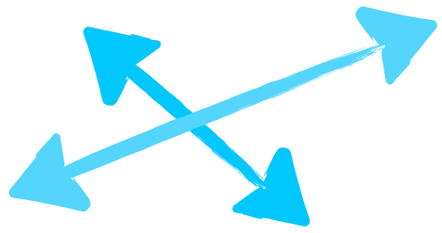
SAMP tool interoperability

Aladin



Topcat





Your own programs

Web pages (VizieR)

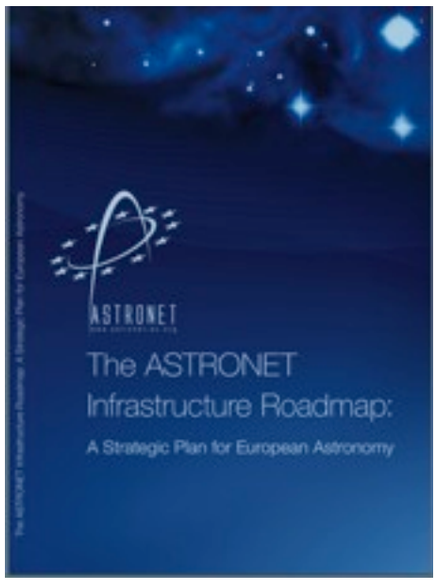
Assisting VO uptake

- Engaging the community: *2008 - Census*
  2013 - CoSADIE Data Centre Forum

- Software libraries:
  - TAP
  - UWS
- UCD and Units tools
- publish your own survey images via Aladin tools (multi-resolution Healpix maps)

VO as Infrastructure

- VO in the ASTRONET Infrastructure roadmap
- recommendations for VO compliance
- Infrastructure sustainability to be addressed by EuroVO CoSADIE



➔ *input to* ASTRONET 2