

Virtual Observatories

Introduction for VO School

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Outline

- Vision of Virtual Observatories
- Global effort to make it work
- VO status in Europe
- How does it work ... how use it?
- How we need your help!

Vision

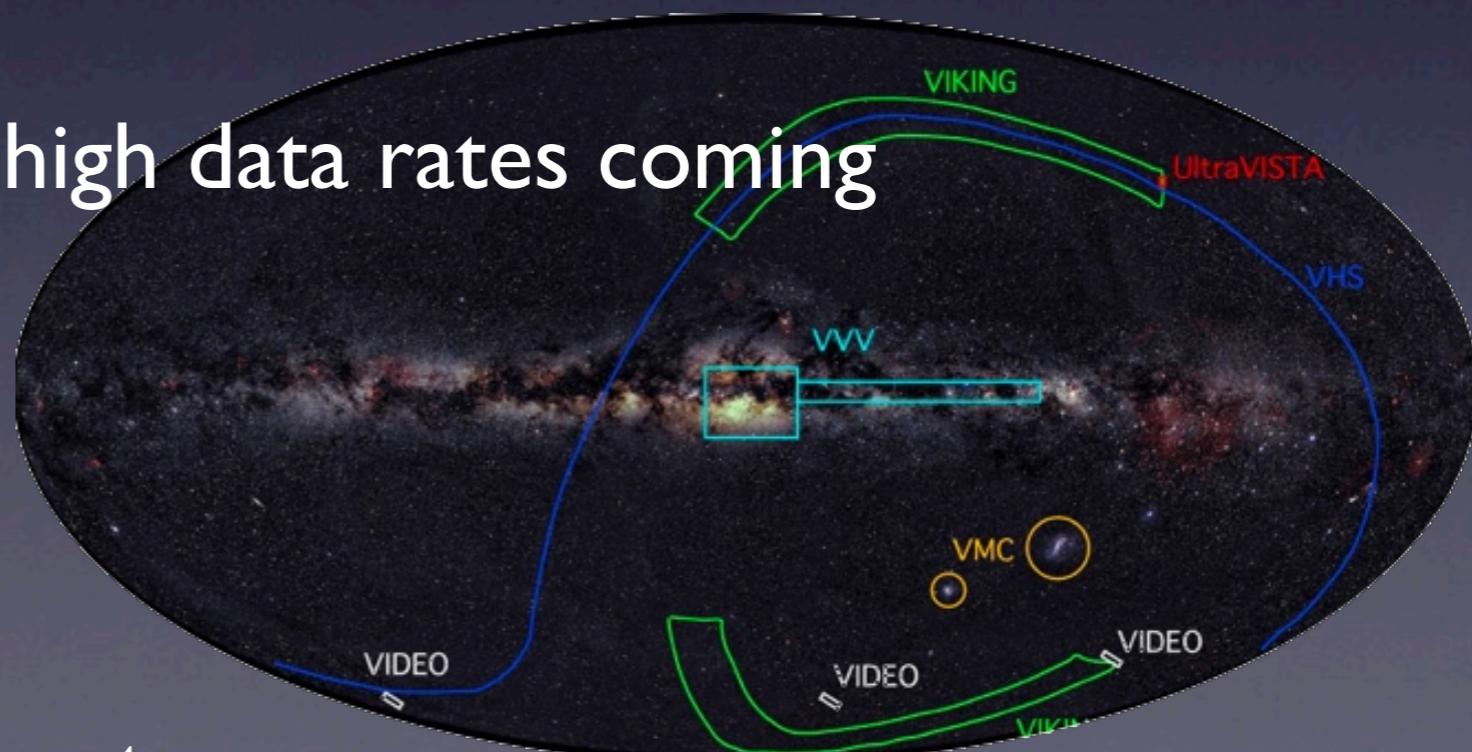
- Archives and databases form a ‘digital sky’
- New possibilities via data discovery, efficient data access and interoperability

Driven by:

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

data data data

- Science goals require very large data sets
 - ★ large number of objects - data mining / statistics
 - ★ large objects! - star streams in the Milky Way
- Sky surveys ~100 TB, high data rates coming
e.g. LSST 5 PB/yr



Multi- λ Astronomy



- Different data types and formats
- Customised archive interfaces and data access methods
- Different analysis tools and techniques

VO aims to

- Take advantage of the data explosion
- Allow astronomers to interrogate multiple data centres in a seamless way
- Permit remote computing and data analysis
- Foster new science

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
 - Science Priorities
 - Connections to data centres



European Status

- National VO projects + ESA-VO
- Coordinated by Euro-VO 
- Recognised in ASTRONET infrastructure roadmap
- Series of EC funded projects from ~2001
- **CoSADIE** : Collaborative and Sustainable Astronomical Data Infrastructure for Europe

CoSADIE aims

- Two aspects
 - Continue the coordination of European VO activities - *Hands-on school, Engage Data Centres, Tech-development, Education*
 - Study all aspects of Euro-VO sustainability: assess the needs and establish a plan for a sustainable Euro-VO, in close collaboration with ASTRONET

How does it work?

USERS

LEVEL 0



COMPUTERS

USER LAYER

USING

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VO
CORE

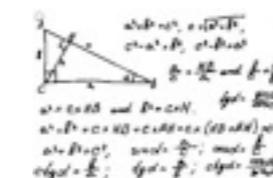
G
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SHARING

RESOURCE LAYER



PROVIDERS

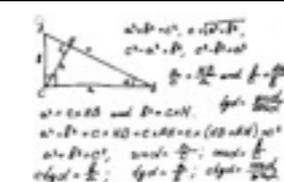
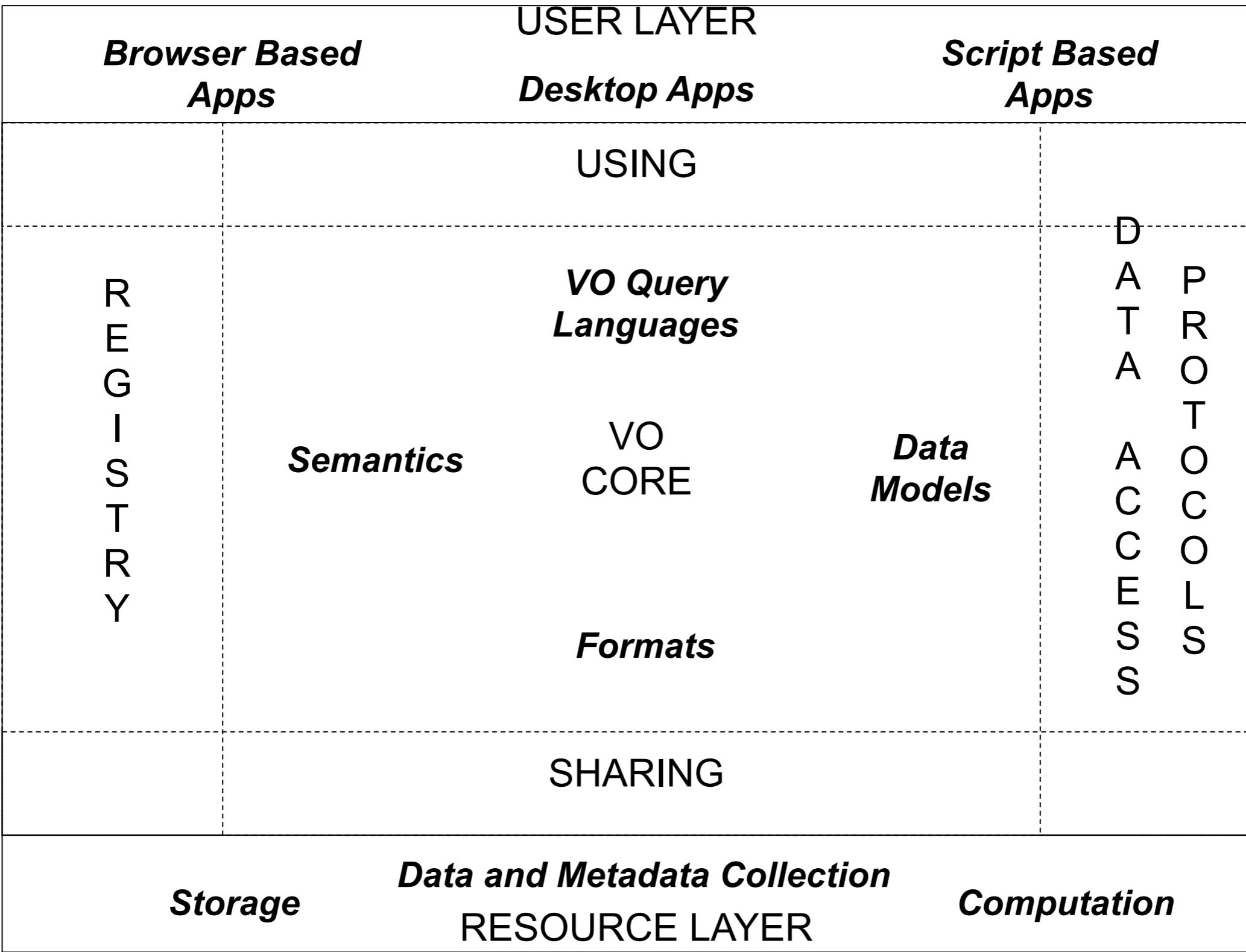


LEVEL 1

USERS



COMPUTERS



LEVEL 2

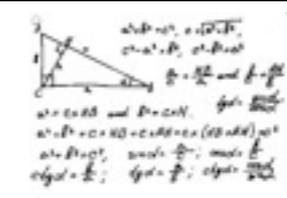
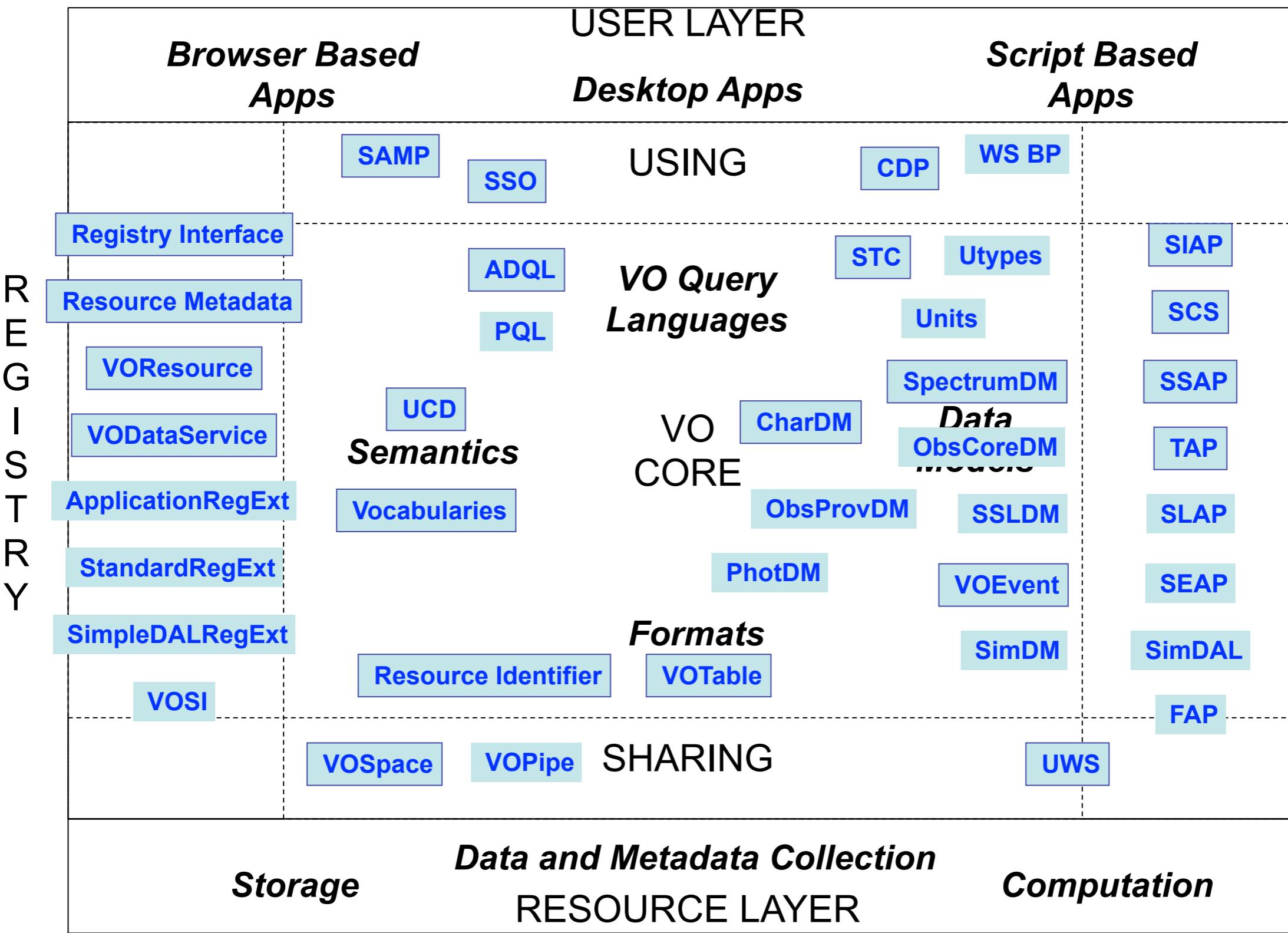
USERS



REC

InProgress

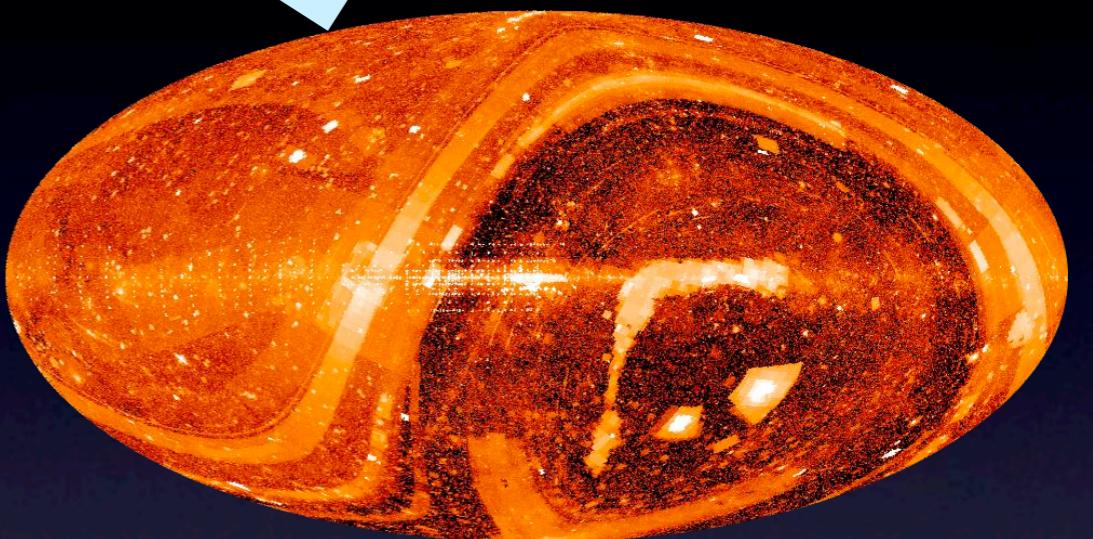
COMPUTERS



VO Standards implemented in the CDS Data Centre



Registry Interface



Reference service for object names



Access to journal catalogue data



Interactive 'portal'

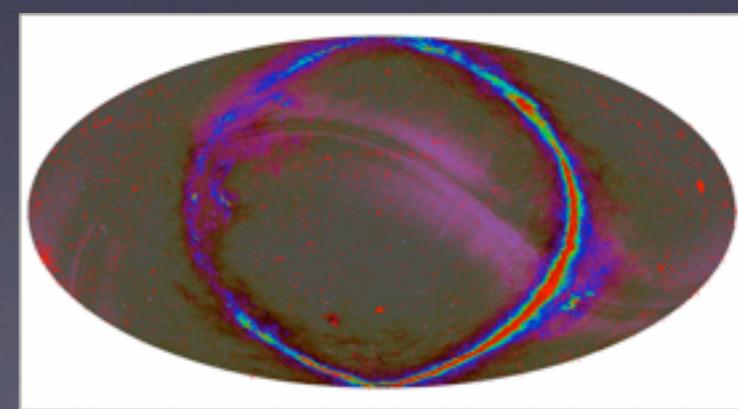
Resource Metadata Identifier

SAMP

ObsCoreDM

SCS

CharDM

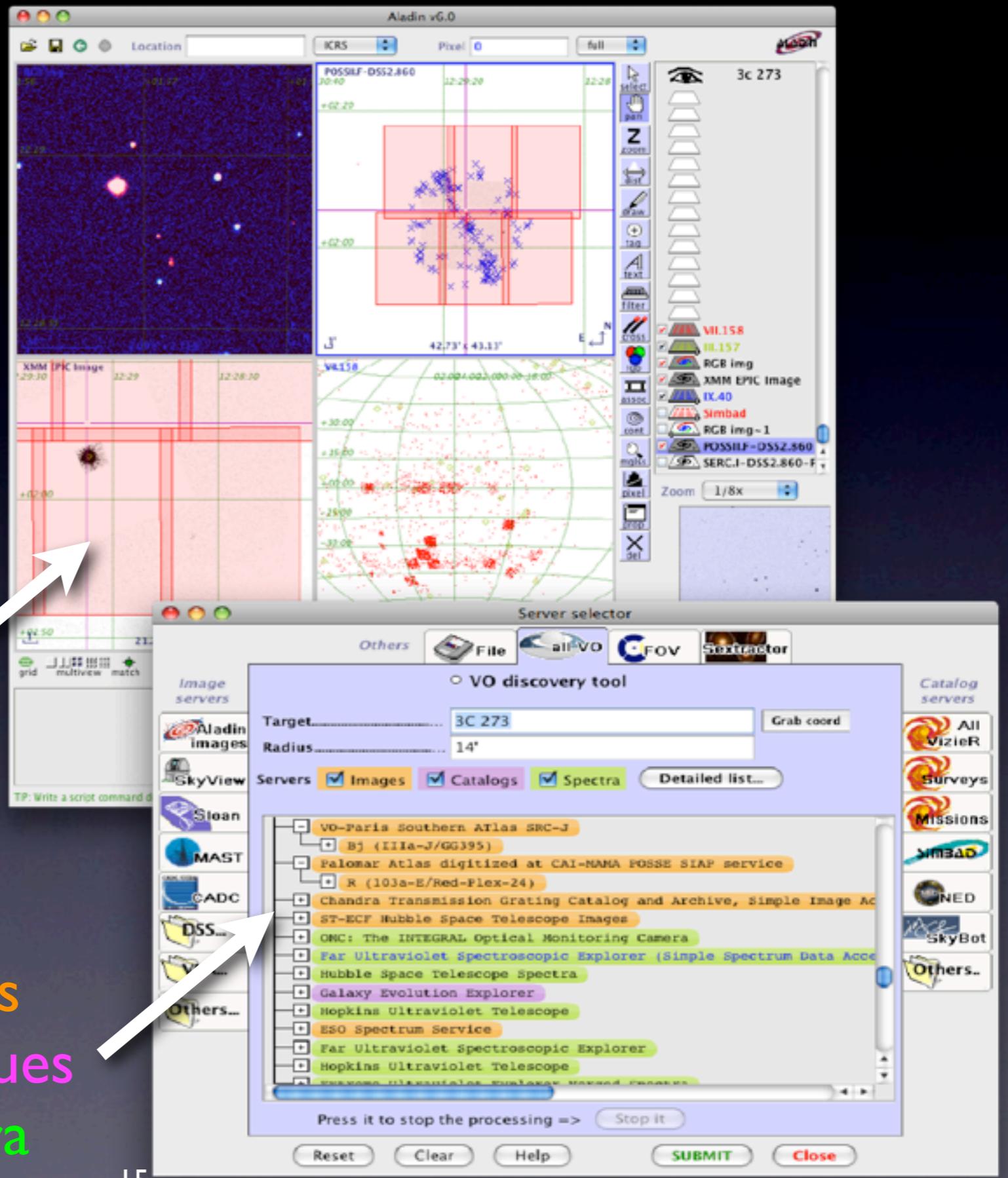


Finding data with Aladin:

- A service can be **found** and **used** by tools that access the registry

Metadata describes
data properties e.g.
FoV

Images
Catalogues
Spectra



Current Status

- Core set of standards established (image, catalogues, spectra)
- Transition to operational phase
- More up-take needed - but also quality control
- Ready for science use

Learning how

- Workshops and schools
- On-line training materials
- From your colleagues

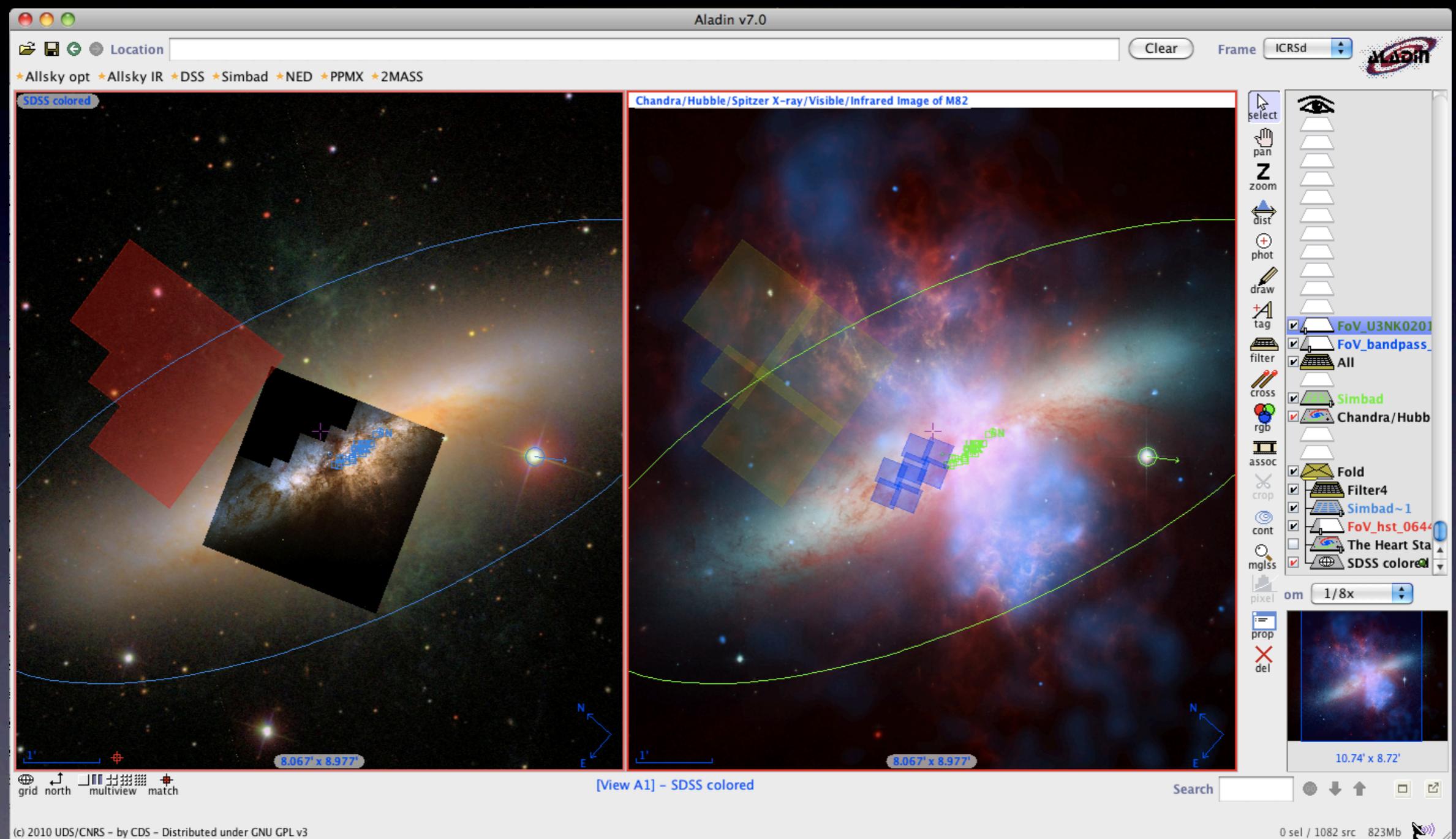


Your help needed

- Feedback on what does/doesn't work
- Suggest new capabilities
- Use it your own science projects
- Tell your colleagues about it

thanks

Beautiful ...



Links

- IVOA - <http://www.ivoa.net>
- EuroVO - <http://www.euro-vo.org>
- CDS - <http://cdsweb.u-strasbg.fr>
- Topcat - <http://www.star.bris.ac.uk/~mbt/topcat/>
- VAO - <http://www.usvao.org/>