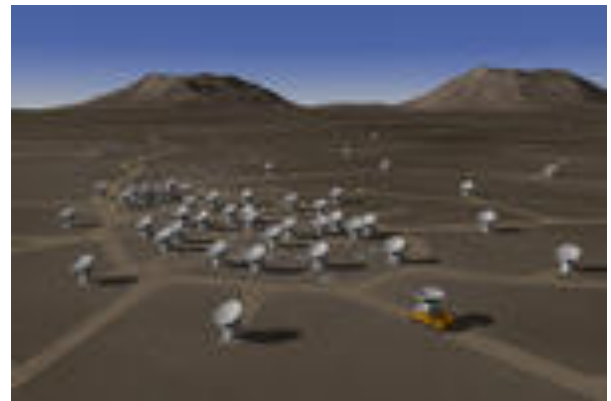
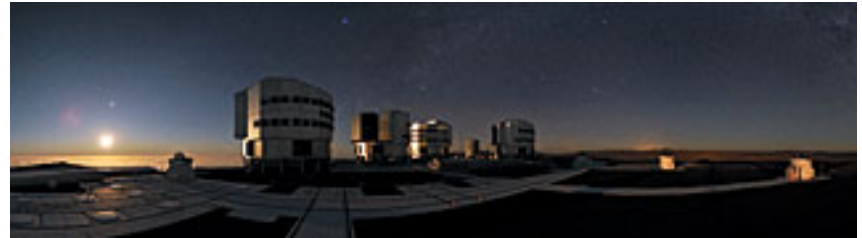
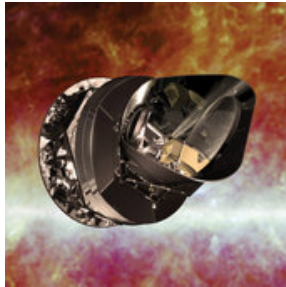


Big Data & Open Data Workshop, 7-8 May 2014

Big Data in the astronomical community

Françoise Genova





- **“Astronomical data”?**
 - **Observations from ground- and space based telescopes (in general competitive calls for proposals)**
 - **Sky surveys (homogeneous data set with up to billions of objects, measurements, images, spectra)**
 - **Modelling results**
 - **Data from publications**
 - **Value-added data bases, which gather homogenized information in particular from publication**
e.g. SIMBAD, names and papers where the object is cited:
7 500 000 objects, 18 500 000 object names, 300 000 references, begun ~1970

- **At the core of astronomy scientific needs**
 - Multi-wavelengths, multi-technique astronomy
 - Comparison of theoretical models with observations
 - Time variability
 - Etc.
- **An example at the “political” level and in practice**
 - A new paradigm on how science is done: we have a practical experience
 - Knowledge of how to share data and how to establish interoperability at the international level

- Change of paradigm done: astronomers use remote distributed data in their everyday work
- Many more papers from data retrieved from archives than from original observations (IUE - 1995, HST, ...)
- Why and how?
 - A **common data format** since the 70s (FITS)
 - Strong tradition of **international collaboration**
 - **Open data** (in general after a proprietary period)
 - **Driven by community needs** (on-line observation archives, on-line services)

- **Networking of on-line resources from 1993-4 (added-value services, journals, archives)**
- **Seamless access to on-line data (~2000)**
The astronomical Virtual Observatory
- **The VO framework : standards and data access tools – discover, access, use data**
- **Standards defined by the International Virtual Observatory Alliance (IVOA)**
 - Procedure inspired from W3C
 - When possible generic elements (OAI-PMH, SKOS/RDF)



IVOA.net - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils ?

IVOA.net

www.ivoa.net

Home Astronomers Deployers Members About

INTERNATIONAL VIRTUAL OBSERVATORY ALLIANCE


The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole. Many projects and data centres worldwide are working towards this goal. The International Virtual Observatory Alliance (IVOA) is an organisation that debates and agrees the technical standards that are needed to make the VO possible. It also acts as a focus for VO aspirations, a framework for discussing and sharing VO ideas and technology, and body for promoting and publicising the VO.

To learn more about the IVOA as an organisation, read the "About" section.

To learn more about the VO from a user's point of view, including how to find VO tools and services, read the "Astronomers" section. There is also a page about the VO for students and the public.


To learn how to publish VO services, or write VO-compatible software, start by reading the "Deployers/Developers" section.

Internal IVOA discussions are publicly viewable in the "Members" section.




IVOA NEWS
September 2013 Issue of the IVOA Newsletter

UPCOMING MEETINGS




For Astronomers




Getting Started / Using the VO
VO Glossary / VO Applications
IVOA newsletter / VO for Students & Public

For Deployers/Developers



Intro to VO Concepts /
IVOA Standards / Guide to
Publishing in the VO / Technical
Glossary

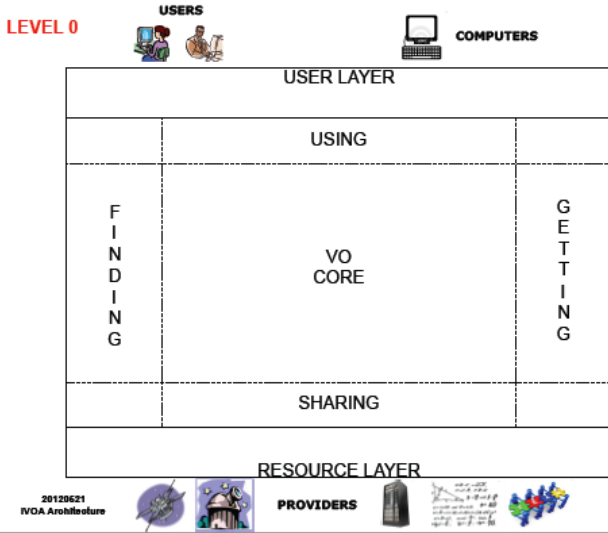
For Members



IVOA Calendar / Working Groups/
Twiki / Documents in Progress /
Mailing Lists / IVOA Roadmap



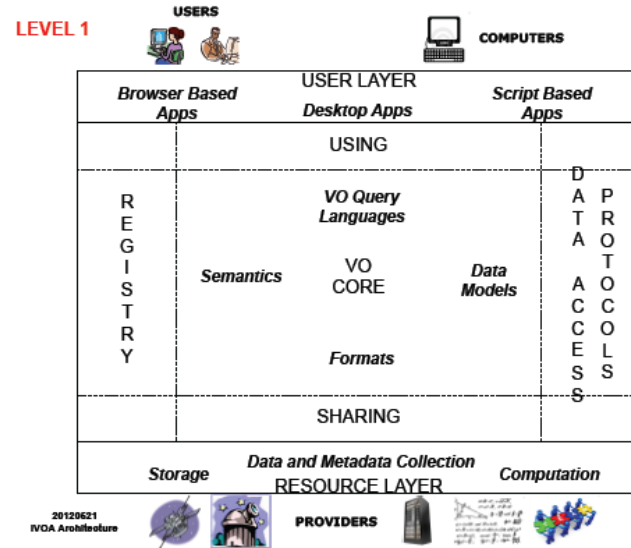
IVOA Architecture Level 0



Stable Since Creation



IVOA Architecture Level 1



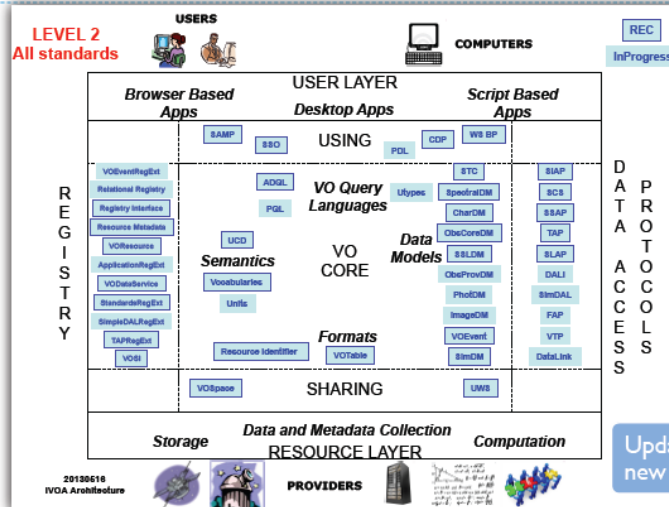
Stable Since Creation

State of TCG 2013-09-26

Séverin Gaudet - 7



IVOA Architecture Level 2

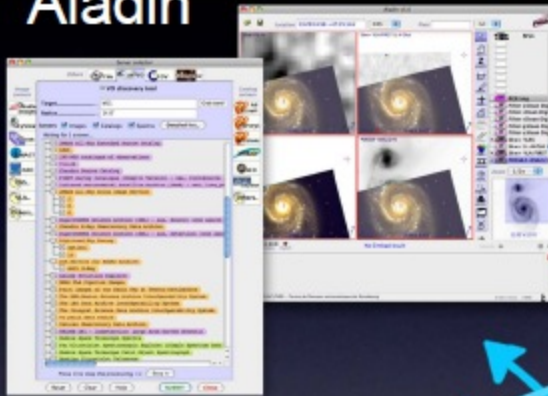


Updated with new standards

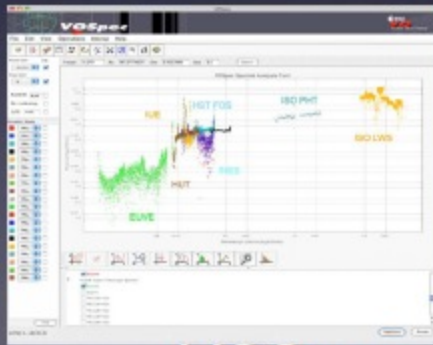
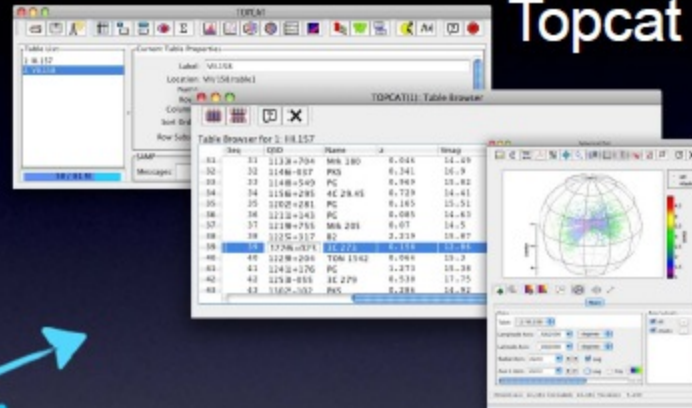
- No central point, a multi-polar world, a global endeavour
- “Open” and inclusive model
 - A thin interoperability layer on top of the data holdings
 - Anyone can register a data service or build a tool (more than 100 “authorities” with a registered service)
- The VO is invisible but used because people use the services and the tools!
- **Key for success: seamless access to data AND interoperable tools**

Interoperability

Aladin



Topcat



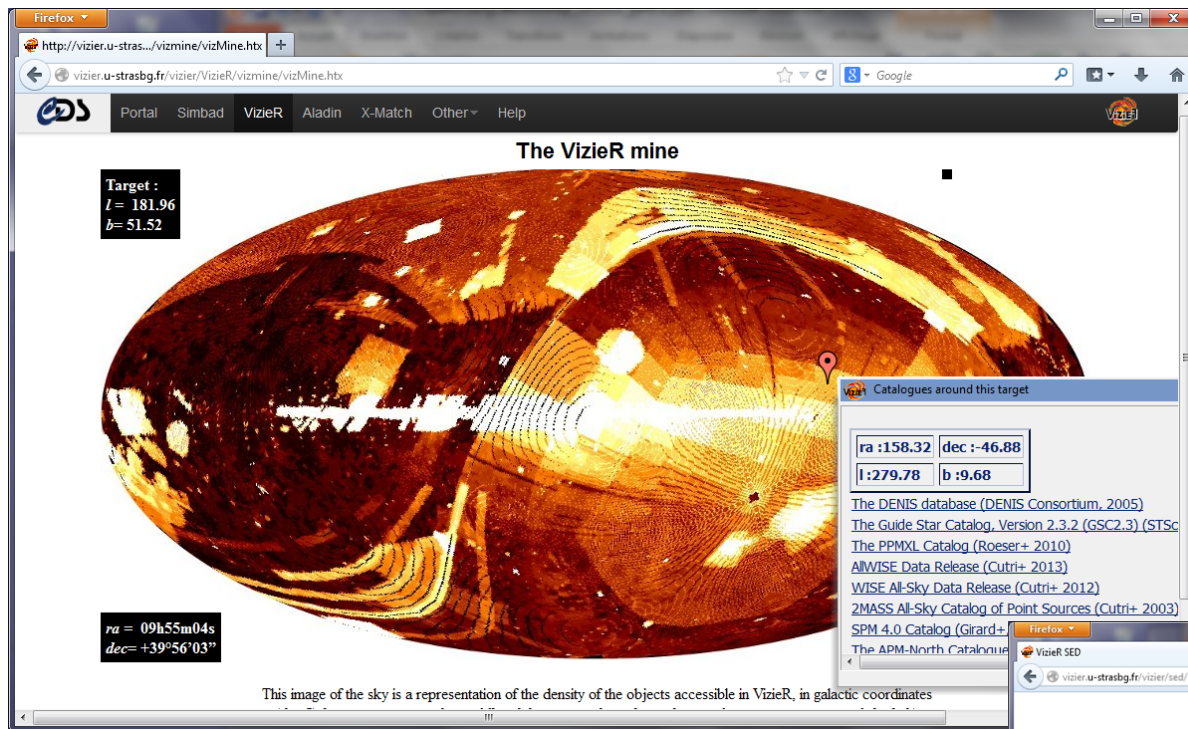
VOSpec



Your programs

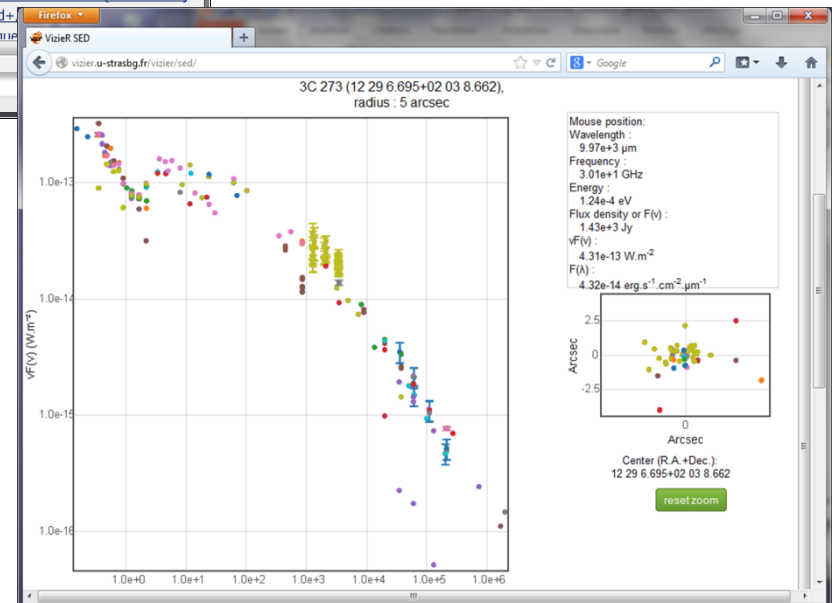


- **Observatory archives + disciplinary data centres**
- **Also data from publications**
 - **Agreement between CDS and the journals (started in 1993)**
 - **tabular data from publications (also images, spectra, time series)**
 - **together with catalogues from sky surveys, space missions (up to 2 billion rows)**
 - **12 000 “catalogues”**
 - **Metadata describing the content**



*Data validated
 by a publication
 Fully discoverable
 and usable*

“Photometry viewer”:
 Spectral points
 extracted from the
 collection



Data is one of the infrastructures of the discipline

