



Binding together IVOA standards into an operational service

Igor Chilingarian (CfA SAO – Char2 team)

Francois Bonnarel (CDS – Char2 team)

Mireille Louys (CDS – Char2 team)

Pierre Le Sidaner (VO-Paris)

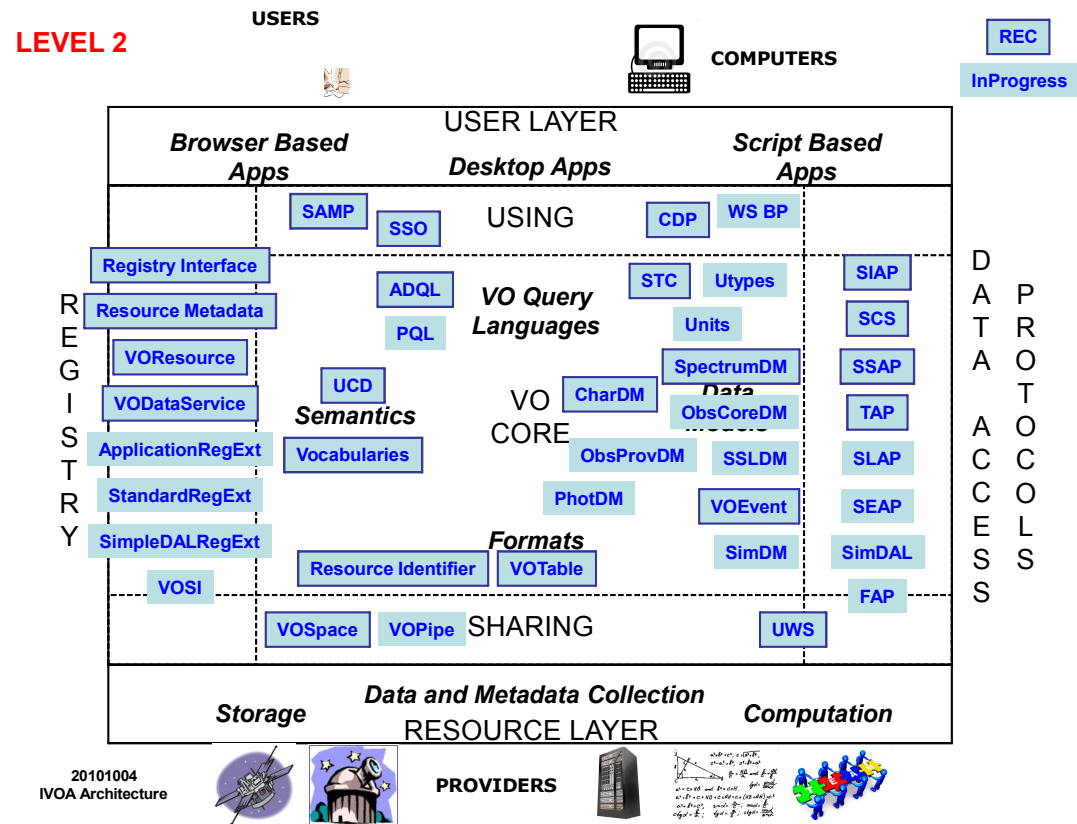




IVOA Standards and operational services

- Many different interoperability standards have been created by IVOA over the last 10 years, some are simple, some are not
- How difficult is it to set up an operational VO service?
- Are simple standards simple?
- What are the connections?
- What are the dependencies?

Lets take a look at real examples





Example #1: collection of 1D spectra

The task is simple: publish a collection of 1D spectra in the VO

- The first step will be to convert all the data into a VO-compliant format, e.g. serialisation of the SpecDM
- The service itself will be provided as an SSAP
- One of the SpecDM serialisations, as well as an SSAP query response are VOTables, therefore handling VOTable is essential too
- **Optional, but highly desirable is to set up the ObsTAP service:**
 - TAP
 - ObsCore



IVOA Standards for an SSA service

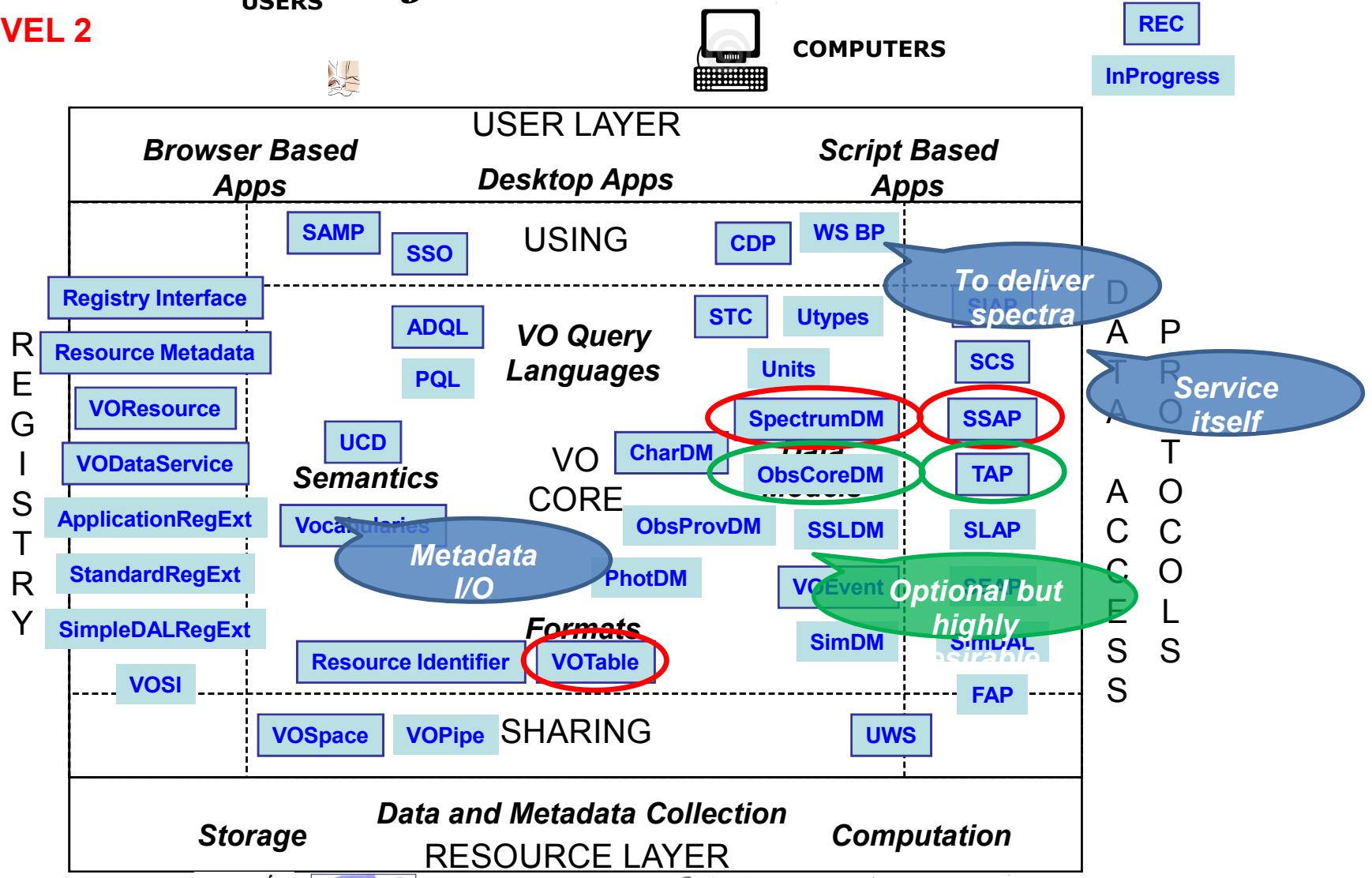
LEVEL 2

USERS

COMPUTERS

REC

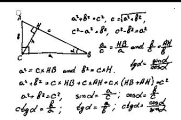
InProgress



20101004 IVOA Architecture



PROVIDERS



l'Observatoire de Paris

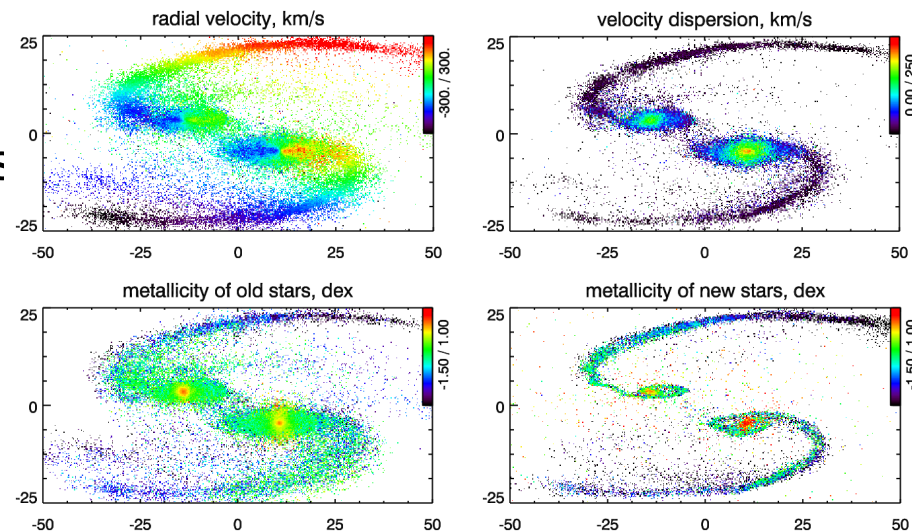
Virtual Observatory Paris Data Centre





Example #2: GalMer Database

- Tree-SPH simulations of major and minor mergers of galaxies at intermediate resolution (0.2 kpc) – thousands of simulations with different mass ratios, orbits, morphologies tracing positions and velocities of particles, star formation and chemistry
- Web-based access at <http://galmer.obspm.fr/>
- About 2Tb of data (FITS binary tables)
- Integration with desktop VO tools (Aladin, Topcat, VOSpec) for data analysis and post-processing
- Value-added tools
 - On-the-fly generation of projected maps for the quantities traced in the simulations
 - Simulated spectra, images, and data cubes using PEGASE2/PEGASE.HR stellar population models





IVOA Standards implemented in GalMer

LEVEL 2

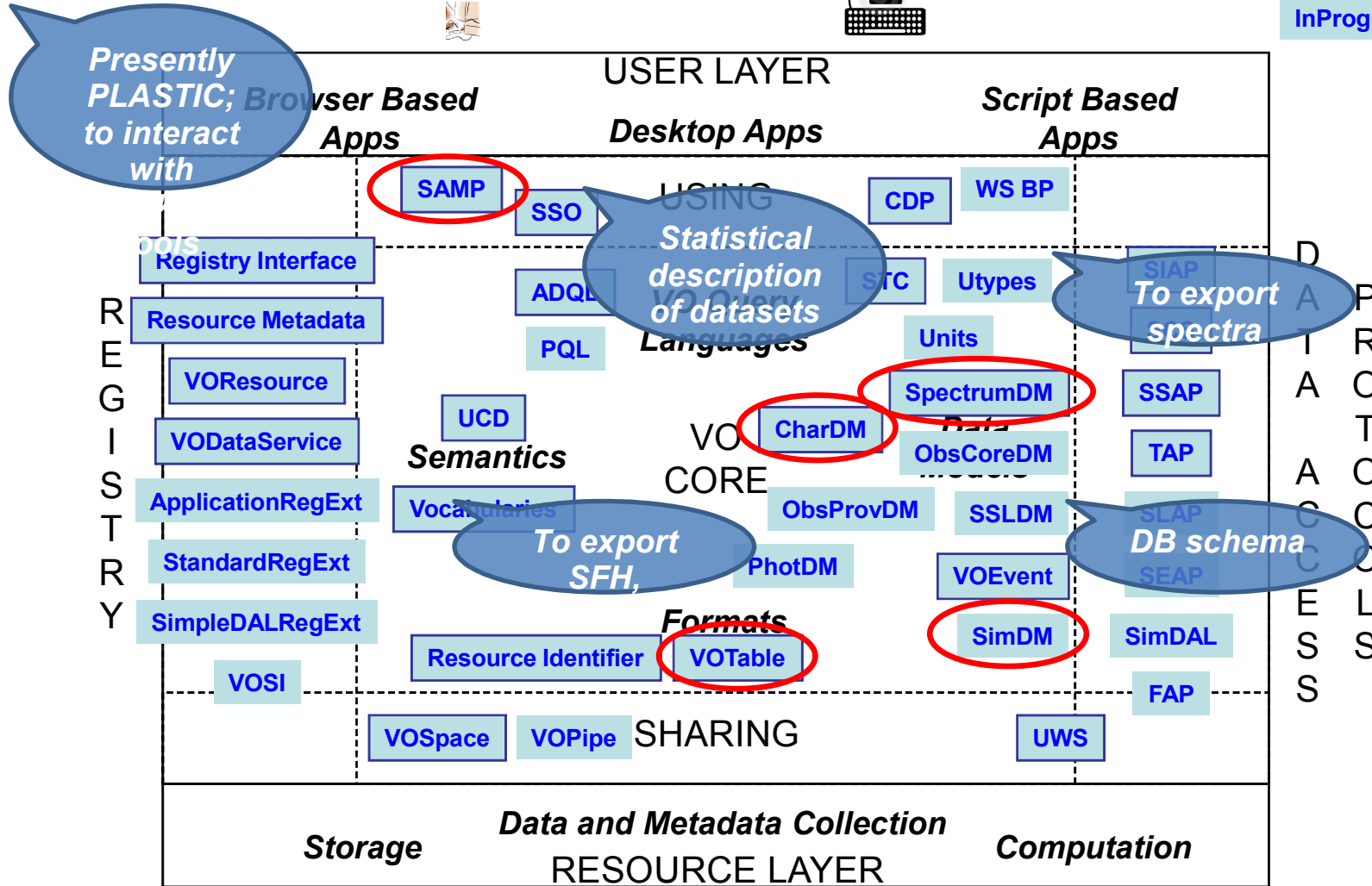
USERS



COMPUTERS

REC

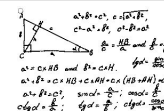
InProgress



20101004 IVOA Architecture



PROVIDERS



l'Observatoire de Paris

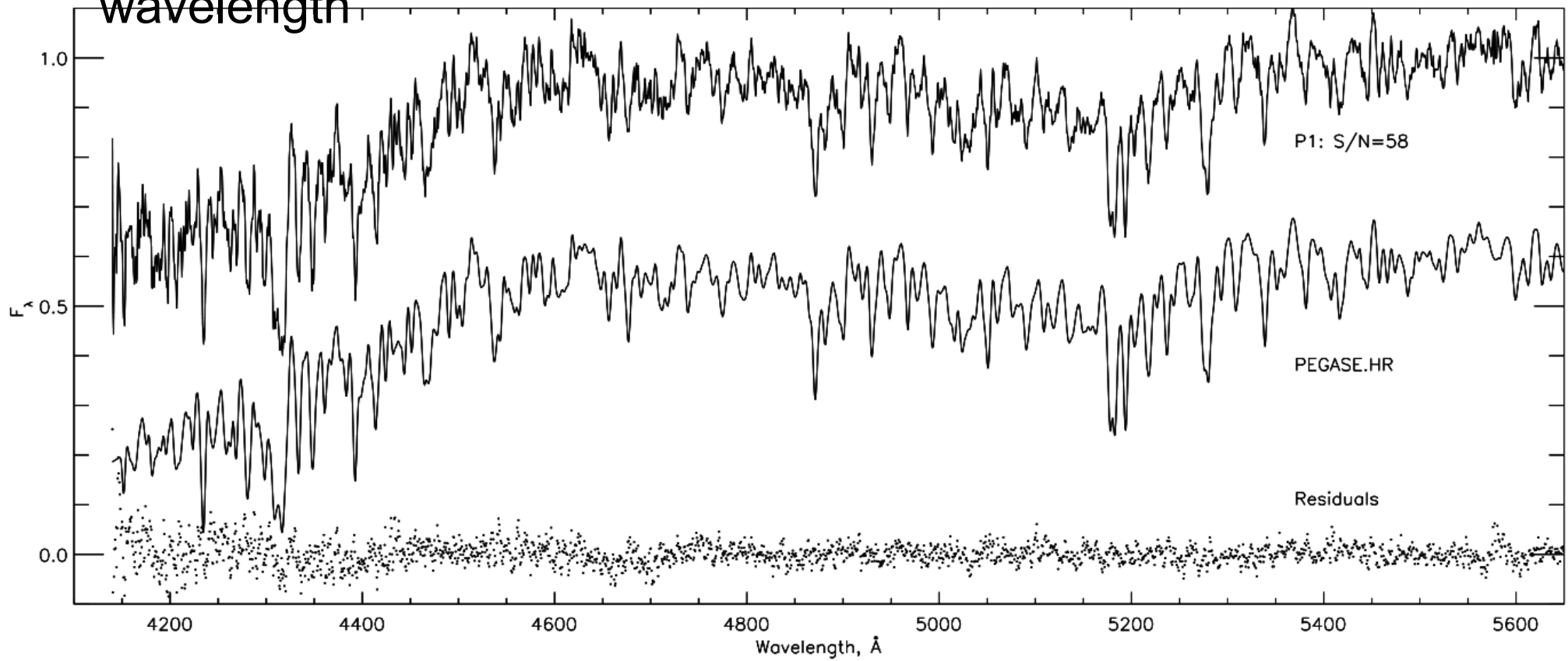
Virtual Observatory Paris Data Centre





Example #3: Full spectrum fitting

- A model is fitted against an observed 1D-spectrum. It has to be convolved with the instrumental response
- Need to know the spectral resolution variation along the wavelength





Algorithm implementation (technical)

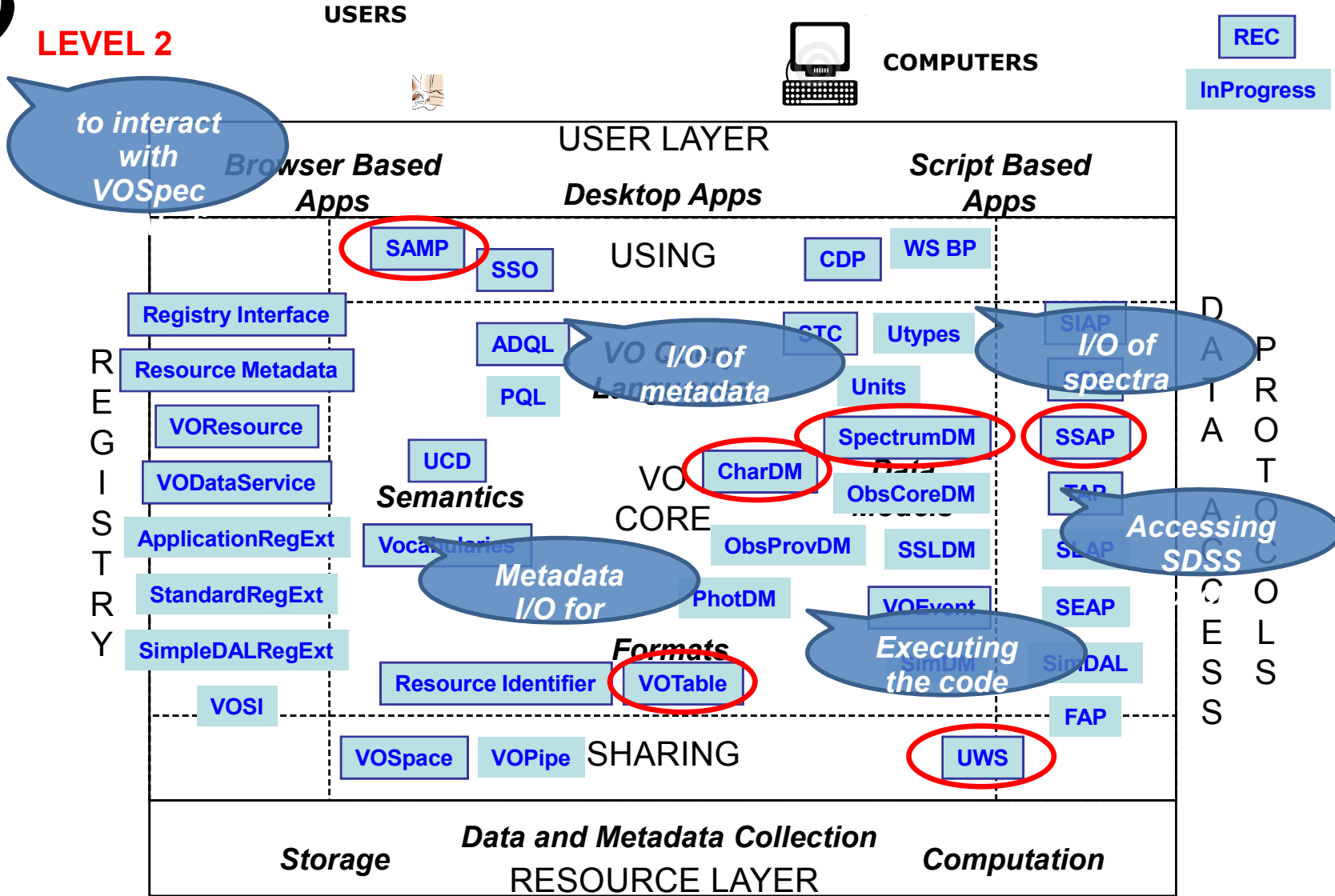
- Penalized Pixel Fitting algorithm (Cappellari & Emsellem 2004)
 - Original code is implemented in IDL and available from the author's homepage
- Re-implemented from scratch in C as a command-line tool
 - GNU Science Library (GSL)
 - levmar-2.5 – an open-source implementation of the Levenberg-Marquardt constrained nonlinear least-square fitting algorithm in C (depends on ATLAS)
 - cfitsio for FITS I/O support
 - I/O of the IVOA Spectrum DM FITS serialization
 - Support of the spectral resolution variation along the wavelength range
- PERL part (http CGI)
 - Parsing Characterisation v.2 XML, extracting and parsing the Access object
- Java part (UWS) – possibility of having multiple results
 - CDS UWS Library v3 (Apache Tomcat as a framework), UWS v3 examples
 - WADL description
 - XSLT transformations for displaying statuses and descriptions



IVOA Standards implemented in PPXF-VO



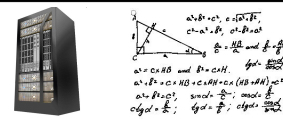
VO LEVEL 2



20101004
IVOA Architecture



PROVIDERS



l'Observatoire de Paris
Virtual Observatory
Paris Data Centre

