

Data Access Layer and Data Model: current status F.Bonnarel

(DAL WG chair: CDS / CNRS)

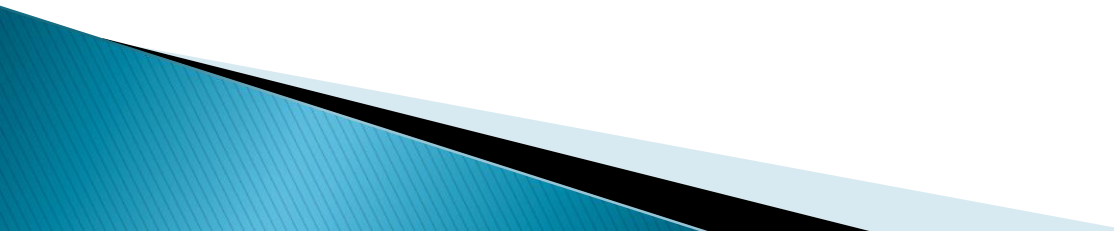
Tanks to M.Molinaro(VP DAL WG : OAT/ INAF) and DAL WG
And Strasbourg colleagues: Mireille, Pierre, Thomas, Laurent



DAL lanscape

- ▶ TAP,ADQL
ObsTAP ([Obscore 1.0])
- ▶ VOTABLE ConeSearch,SIAV1
SSA1.1
DALI 1.0 (common spec)
SIAV2.0
SODA 1.0 (AccessData)
DataLink 1.0

TAP (and ADQL)

- ▶ universal interface for relational databases
 - ▶ Synchronous and asynchronous modes(based on UWS)
 - ▶ ADQL: SQL extended for astronomy and generic
 - ▶ TAP schema for table and columns descriptions.
 - ▶ ObsTAP implements a universal table based on ObsCore
- 

ObsTAP, SIAV2, SODA Cube Access scenario

- I) Scenario :
 - > find out cube services from registry.
 - **ObsTap (generic, ObsCore, ADQL)**
 - SIAV2 (cube-oriented, parameterQuery)
- II) Query from an ObsTAP service
 - « select * from Obscore where dataproduct_type = cube »
 - > the query response is a VOTABLE serializing the ObsCore model and describing the selected datasets.

ObsTAP, SIAV2, SODA Cube Access scenario

- I) Scenario :
 - > find out cube services from registry.
 - ObsTap (generic, ObsCore, ADQL)
 - SIAV2 (cube-oriented, parameterQuery)
- II bis) Query from a SIAV2 service
 - « `http://.....?pos=circle 3.0 2.0 1.0&band=0.001 0.003&time=56000 57000&POL=V` »
 - > the query response is a VOTABLE serializing the ObsCore model and describing the selected datasets.

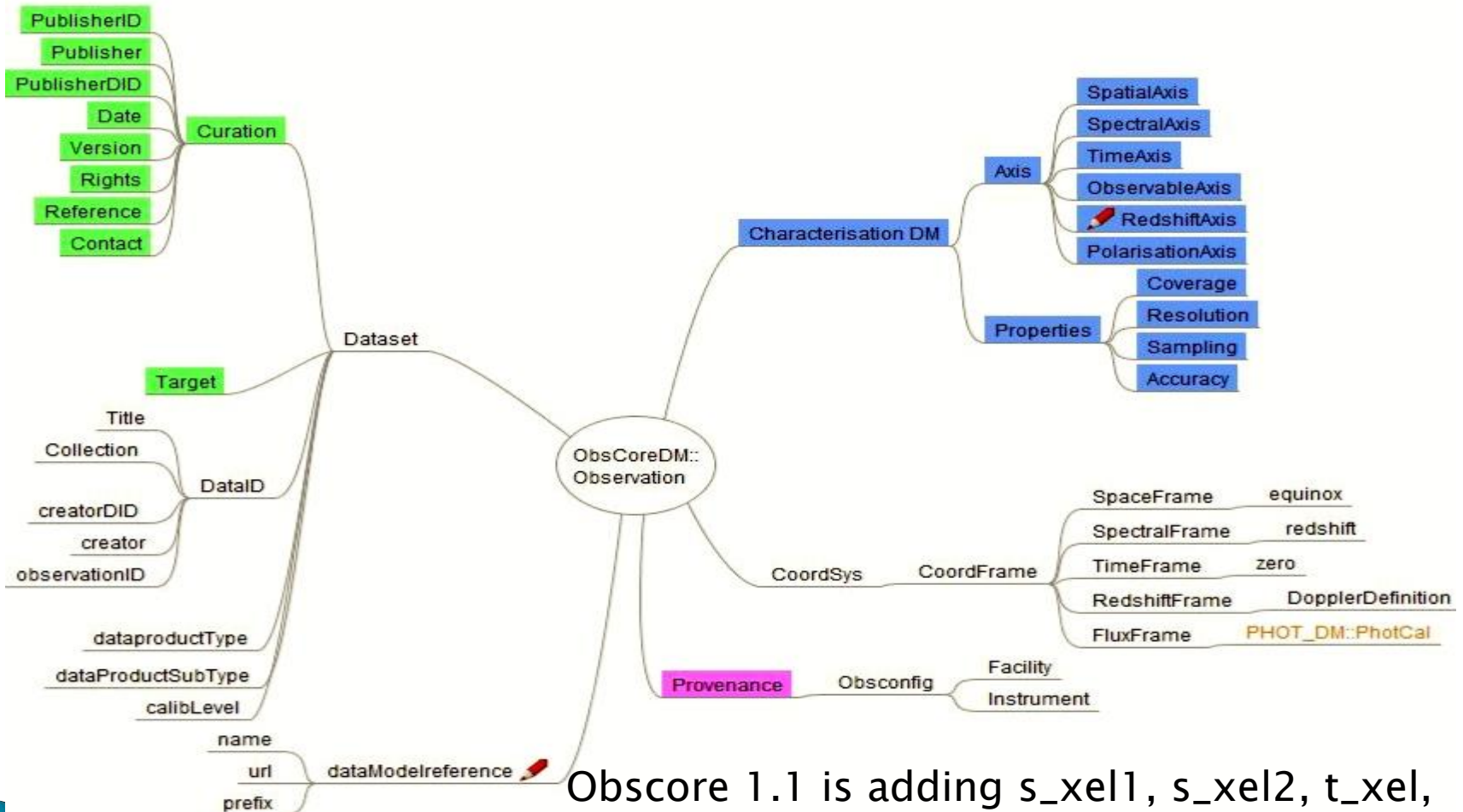
ObsTAP, SIAV2, SODA Cube Access scenario

- III) DataLink {links} resource
 - fixed links,
 - metadata services,
 - Custom services (DL service descriptor)
 - SODA service
- III bis) direct path to SODA (DL service descriptor)
- IV) SODA:
 - Cutout driven by parameters identical to Query
 - POS=CIRCLE 12 34 0.5
 - POS= POLY 12.0 14.0 12.0 16.0 15.0 16.0 15.0 14.0
 - BAND=500 550
 - TIME= 55000.0 56000.0
 - POL=Q,POL=.....

Spectra, 2D images

- ▶ Similar Scenarii with SSA and SIAV1
- ▶ No SODA, some functionalities of cutout/mosaicking in SIAV1 and SSA

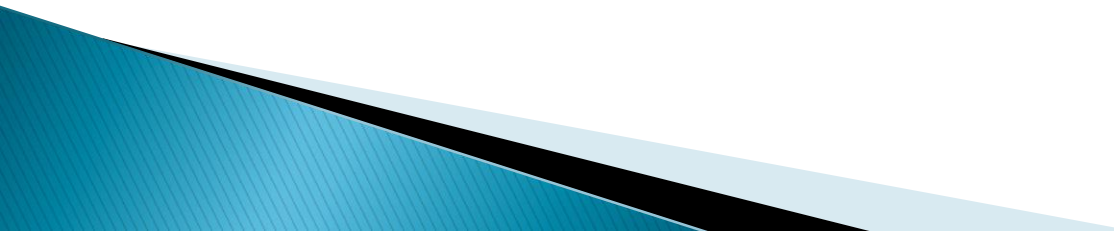
ObsCore Heuristic Map



Obscore 1.1 is adding s_xel1, s_xel2, t_xel, em_xel dimensions
 Discovery of « doppler velocity » cubes,

Implementations of SIAV2 / OBsTAP with Cubes

- ▶ SIAV2
 - Amiga,
 - CADC,
 - CASDA,
 -

 - ▶ ObsTAP avec Cubes
 - CADC,
 - CASDA,
 - GAVO,
 - XMM SSC,
 - ...
- 

DataLink

service descriptor

- ▶ General mechanism for any PARAM=... based HTTP service description
- ▶ Based on the VOTABLE PARAM features.
- ▶ 3 factor semantics: name, unit, ucd

```
▶ <RESOURCE type="meta" utype="ad hoc:service" ID="soda-sync">
▶ <PARAM arraysize="*" datatype="char" name="accessURL" value="http://www.cadc-ccda.hia-ihh.nrc.cnrc.gc.ca/caom2ops/sync"/>
▶ <GROUP name="inputParams">
▶   <PARAM arraysize="*" datatype="char" name="ID" value="" ref="fileURIRef"/>
▶   <PARAM arraysize="*" ucd="obs.field" datatype="char" name="PAR1" >
▶     <VALUES>
▶       <MIN>.....</MIN>
▶       <MAX>.....</MAX>
▶       <OPTION>.....</OPTION>
▶     </VALUES>
▶   <PARAM arraysize="2" ucd="em.wl;stat.interval" datatype="double" name="PAR2" unit="m" />
▶   <PARAM arraysize="2" ucd="time;stat.interval" datatype="double" name="PAR3" unit="d" />
▶   <PARAM arraysize="2*" ucd="phys.polarization.stokes" datatype="char" name="PAR4" />
▶ </GROUP>
▶ </RESOURCE>
```

DataLink

service descriptor

- ▶ Can describe custom and standard services (to help clever clients)
 - SIA, SSA, COneSearch
 - DataLink {links} resource
 - SODA

```
▶ <RESOURCE type="meta" utype="adhoc:service" ID="soda-sync">
▶   <PARAM arraysize="" datatype="char" name="resourceIdentifier" value="ivo://cadc.nrc.ca/soda#sync"><
▶   <PARAM arraysize="" datatype="char" name="standardID" value="ivo://ivoa.net/std/SODA#sync-1.0"/>
▶   <PARAM arraysize="" datatype="char" name="accessURL" value="http://www.cadc-ccda.hia-ih.nrc.cnrc.gc.ca/caom2ops/sync"/>
▶   <GROUP name="inputParams">
▶     <PARAM arraysize="" datatype="char" name="ID" value="" ref="fileURIRef"/>
▶     <PARAM arraysize="" ucd="obs.field" datatype="char" name="POS" value=""/>
▶     <PARAM arraysize="2" ucd="em.wl;stat.interval" datatype="double" name="BAND" unit="m" value="" xtype="interval"/>
▶     <PARAM arraysize="2" ucd="time;stat.interval" datatype="double" name="TIME" unit="d" value="" xtype="interval"/>
▶     <PARAM arraysize="2*" ucd="phys.polarization.stokes" datatype="char" name="POL" value=""/>
▶   </GROUP>
▶ </RESOURCE>
```

DataLink

{links} RESOURCE

Historical DataLink

The list of links that is returned by the {links} resource can be represented as a table with the following columns:

name	description	required	UCD
ID	Input identifier	yes	meta.id;meta.main
access_url	link to data or service	one only	meta.ref.url
error_message	error if an accessURL cannot be created		meta.code.error
service_def	reference to the description of a service at access_url	no	meta.ref
description	human-readable text describing this link	no	meta.note
semantics	limited vocabulary describing this link	no	meta.code
content_type	mime-type of file the link returns	no	meta.code.mime
content_length	size of download the link returns	no	phys.size;meta.file

- Cube average (fixed links), accesdata, (*custom services*)
- Calibration data, metadata, SODA (with help of descriptor)

Current protocol status

- ▶ DataLink 1.0 is a recommendation since June 2015
- ▶ SIAV2.0 is a recommendation since December 23rd 2015
- ▶ SODA 1.0 (Server-side Operations for Data Access , former AccesData). → Working draft. Mostly done. Still in Active discussion for details.
- ▶ ObsCore 1.1 coming up
- ▶ -----
- ▶ VOTP (VOEvent transport protocol, will start the RFC),
- ▶ DALI 1.1 Working draft
- ▶ ADQL 2.1 in internal working Draft
- ▶ TAP 1.1 is internal Working Draft
- ▶ SimDAL 1.0 : Working draft
- ▶ TAPREGext : « Proposed recommendatioon »

DAL landscape

- ▶ TAP,ADQL
ObsTAP ([Obscore 1.0])
→ObsCore 1.1
- ▶ VOTABLE ConeSearch,SIAV1
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DALI 1.0 (common spec)
→DALI 1.1
SIAV2.0
SODA 1.0 (AccessData)
- ▶ DataLink 1.0

Plenty of use cases for next versions of DataLink
SIAV2 and SODA, but we need feedback on the first
steps

Three possible access modes

- ▶ 1) add provenance attributes to main discovery response table .
 - Additional query parameters in « Simple Access » mode and additional attributes in Obscure Table (or joints)
- ▶ 2) Based on obs_publisher_did . HTTP interface with ID=..... → call it « ProvDAL »
 - datasets are already discovered; Format can be Prov-N, json, Prov-xml, VOTABLE...
- ▶ 3) ProvTAP : TAP service, provDM mapping in TAP schema. ADQL queries with constraint on any attribute
 - May allow dataset discovery via provenance.
- ▶ If we have 3) we may easily build 2) . Reverse is not true

Usage of DataLink « gluing » technology

▶ Service descriptor :

- Additional input PARAMETERS in discovery simple services (successor of « FORMAT= METADATA »)
- PROVDAL description in discovery responses
- (Obscore) link in ProvTAP response

▶ {links Resource}

- Used for PROVDAL if we want to link dataset with more than one resource (that is PROVDAL and something else)
- ObsCore among others resources linked to ProvTAP response.



DM \leftrightarrow DAL

- ▶ Obscore -----> ObsTAP, SIAV2.0
- ▶ Spectrum 1.0 Spectral 2.0 --> SSA
- ▶ CubeDM (+Daset) -->SIAV2.1
- ▶ SimDM - > SimDB, SimDAL
- ▶ Provenance -> « PProvTAP »
- ▶ Provenance -> « ProvDAL »