How to describe your observation metadata in the VO Framework?

Observation Core components Data Model

VO Data Modeling Working Group

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ObsCore Data Model

- Designed for data discovery accross multiple archives for multi-wavelength search
- Common framework for querying all kind of data products obtained during an observation process
- Defined from a large set of discovery use-cases

  http://saada.unistra.fr/voexamples/show/ObsCore

One extracted example

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INTERNATIONAL VIRTUAL OBSERVATORY ALLIANCE

ObsCore: Any dataset at specified values for energy, position and time duration (V1.0)

[dali xhtml] [title] [description] [query]

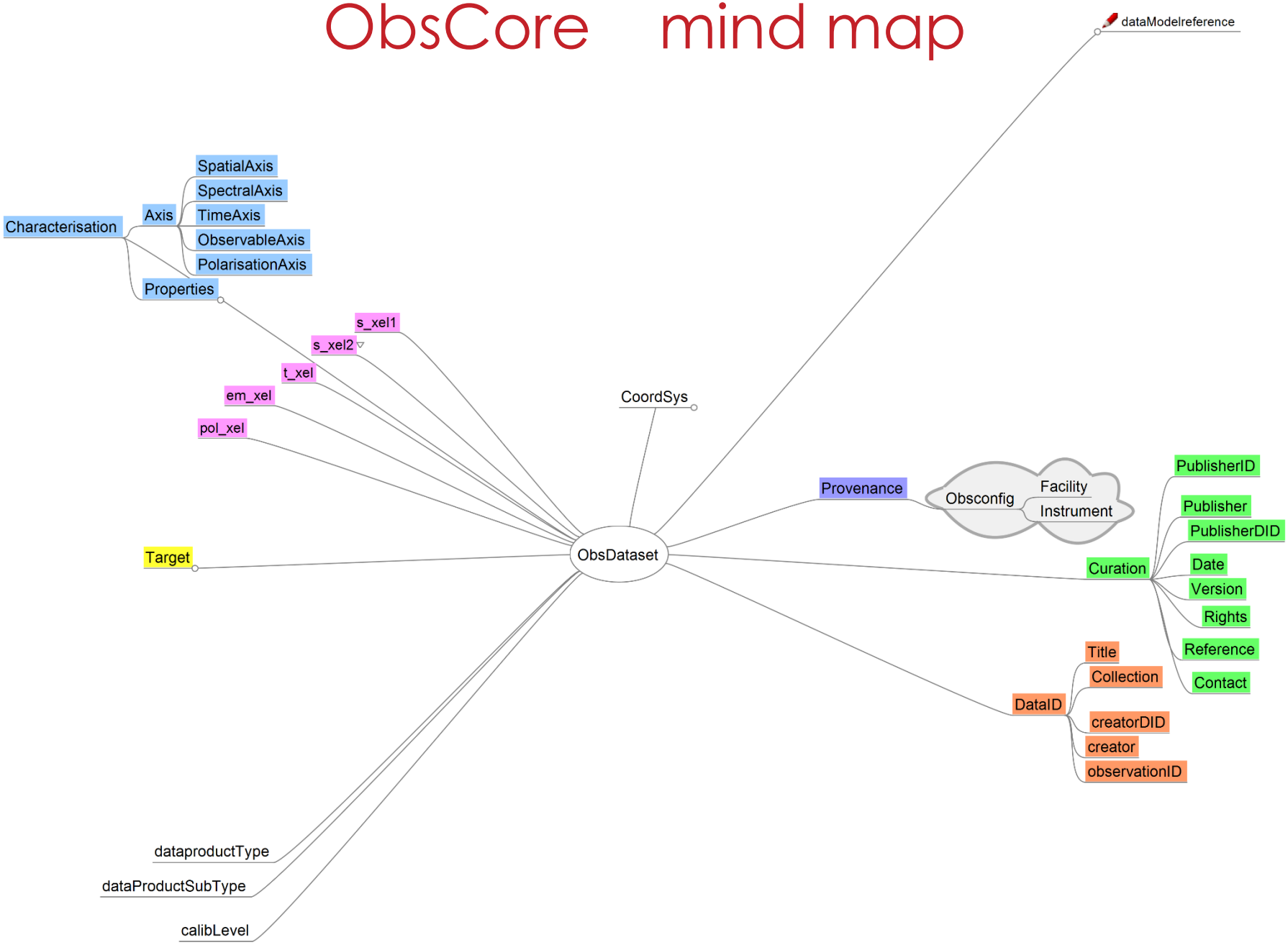
Show me all observations satisfying:

I. DataType = any
II. Energy includes 5 keV
III. RA includes 16.00
IV. DEC includes +10
V. Exposure time > 10 ks

Query

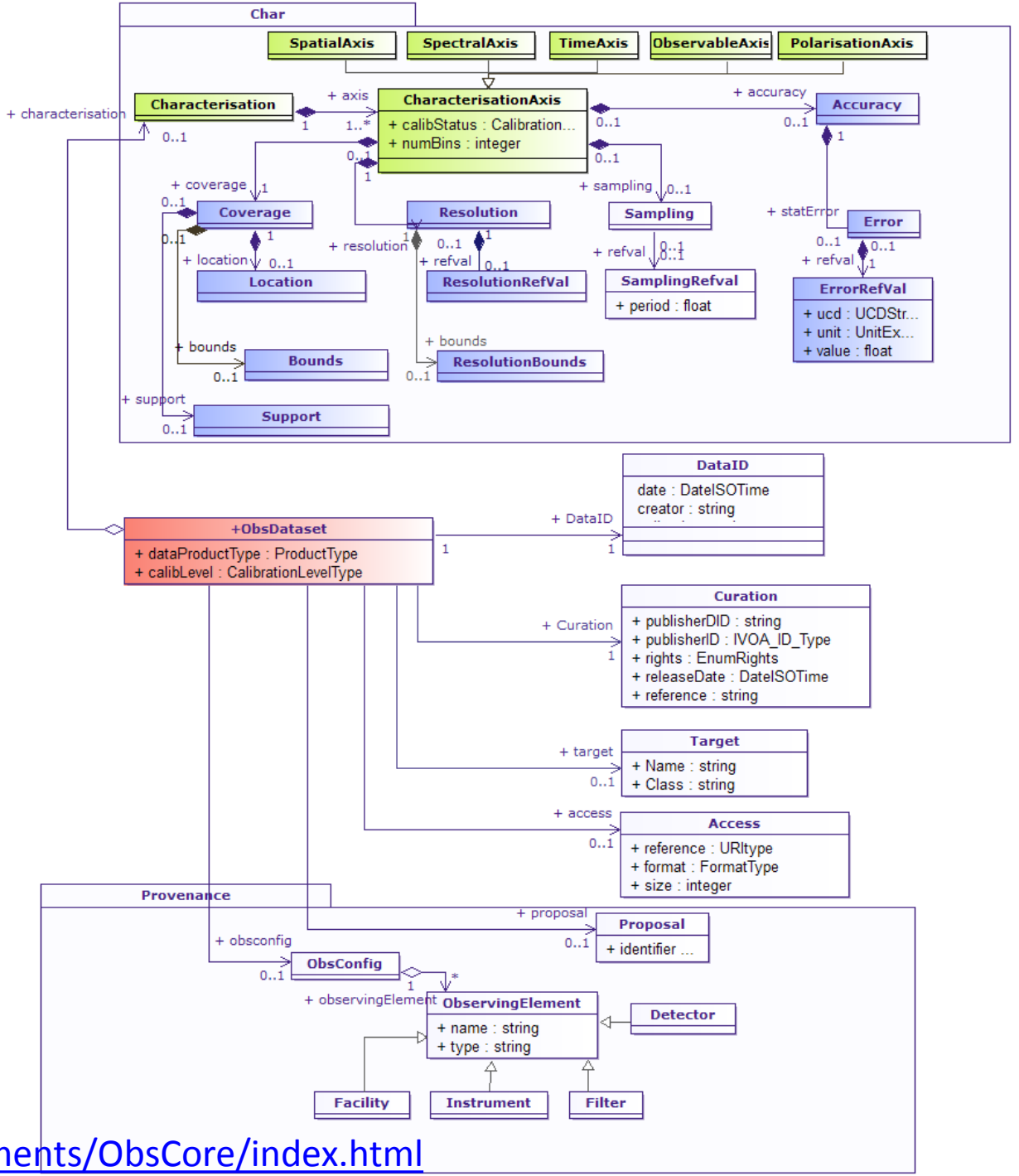
```
SELECT *
FROM ivoa.Obscore
WHERE em_min < 2.48E-10
  AND em_max > 2.48 E-10
  AND CONTAINS(POINT('ICRS',16.0,10.0),s_region) = 1
  AND t_exptime > 10000
```

ObsCore mind map



ObsCore

UML Class diagram



http://www.ivoa.net/documents/ObsCore/index.html

Tap Schema *ivoa.Obscore*

Mandatory fields v1.1

Column Name	*Datatype*	*Size*	*Units*	*ObsCoreDM Utype*	*UCD*
dataproduct_type	adql:VARCHAR	TBD	NULL	ObsDataset.dataProductType	meta.id
calib_level	adql:INTEGER	NULL	NULL	ObsDataset.calibLevel	meta.code;obs.calib
obs_collection	adql:VARCHAR	TBD	NULL	DataID.collection	meta.id
obs_id	adql:VARCHAR	TBD	NULL	DataID.observationID	meta.id
obs_publisher_did	adql:VARCHAR	TBD	NULL	Curation.publisherDID	meta.ref.url;meta.curation
access_url	adql:CLOB	NULL	NULL	Access.reference	meta.ref.url
access_format	adql:VARCHAR	NULL	NULL	Access.format	meta.code.mime
access_estsize	adql:BIGINT	NULL	kbyte	Access.size	phys.size;meta.file
target_name	adql:VARCHAR	TBD	NULL	Target.name	meta.id;src
s_ra	adql:DOUBLE	NULL	deg	Char.SpatialAxis.Coverage.Location.Coord.Position2D.Value2.C1	pos.eq.ra
s_dec	adql:DOUBLE	NULL	deg	Char.SpatialAxis.Coverage.Location.Coord.Position2D.Value2.C2	pos.eq.dec
s_fov	adql:DOUBLE	NULL	deg	Char.SpatialAxis.Coverage.Bounds.Extent.diameter	phys.angSize;instr.fov
s_region	adql:REGION	NULL		Char.SpatialAxis.Coverage.Support.Area	pos.outline;obs.field
s_resolution	adql:DOUBLE	NULL	arcsec	Char.SpatialAxis.Resolution.Refval.value	pos.angResolution
s_xel1	adql:BIGINT	NULL	NULL	Char.SpatialAxis.numBins1	meta.number
s_xel2	adql:BIGINT	NULL	NULL	Char.SpatialAxis.numBins2	meta.number
t_min	adql:DOUBLE	NULL	d	Char.TimeAxis.Coverage.Bounds.Limits.StartTime	time.start;obs.exposure
t_max	adql:DOUBLE	NULL	d	Char.TimeAxis.Coverage.Bounds.Limits.StopTime	time.end;obs.exposure
t_exptime	adql:DOUBLE	NULL	s	Char.TimeAxis.Coverage.Support.Extent	time.duration;obs.exposure
t_resolution	adql:DOUBLE	NULL	s	Char.TimeAxis.Resolution.Refval.value	time.resolution
t_xel	adql: BIGINT	NULL	NULL	Char.TimeAxis.numBins	meta.number
em_min	adql:DOUBLE	NULL	m	Char.SpectralAxis.Coverage.Bounds.Limits.LoLimit	em.wl;stat.min
em_max	adql:DOUBLE	NULL	m	Char.SpectralAxis.Coverage.Bounds.Limits.HiLimit	em.wl;stat.max
em_res_power	adql:DOUBLE	NULL	NULL	Char.SpectralAxis.Resolution.ResolPower.refVal	spect.resolution
em_xel	adql: BIGINT	NULL	NULL	Char.SpectralAxis.numBins	meta.number
o_ucd	adql:VARCHAR	TBD	NULL	Char.ObservableAxis.ucd	meta.ucd
pol_states	adql:VARCHAR	TBD	NULL	Char.PolarizationAxis.stateList	meta.code;phys.polarization
pol_xel	adql: BIGINT	NULL	NULL	Char.PolarizationAxis.numBins	meta.number
facility_name	adql:VARCHAR	NULL	NULL	Provenance.ObsConfig.Facility.name	meta.id;instr.tel
Instrument_name	adql:VARCHAR	NULL	NULL	Provenance.ObsConfig.Instrument.name	meta.id;instr

ivoa.Obscore extension

Optional fields

Column Name	Datatype	Size	Units	ObsCoreDM Utype	UCD
dataproduct_subtype	adql:VARCHAR	TBD	NULL	ObsDataset.dataProductSubtype	meta.id
target_class	adql:VARCHAR	TBD	NULL	Target.class	src.class
obs_creation_date	adql:TIMESTAMP	NULL	NULL	DataID.date	time;meta.dataset
obs_creator_name	adql:VARCHAR	TBD	NULL	DataID.creator	meta.id
obs_creator_did	adql:VARCHAR	TBD	NULL	DataID.creatorDID	meta.id
obs_title	adql:VARCHAR	200	NULL	DataID.title	meta.title;obs
publisher_id	adql:VARCHAR	TBD	NULL	Curation.publisherID	meta.ref.url;meta.curation
bib_reference	adql:VARCHAR	TBD	NULL	Curation.reference	meta.bib.bibcode
data_rights	adql:VARCHAR	NULL	NULL	Curation.rights	meta.code
obs_release_date	adql:TIMESTAMP	NULL	NULL	Curation.releaseDate	time.release
s_ucd	adql:VARCHAR	NULL	NULL	Char.SpatialAxis.ucd	meta.ucd
s_unit	adql:VARCHAR	NULL	NULL	Char.SpatialAxis.unit	meta.unit
s_resolution_min	adql:DOUBLE	NULL	arcsec	Char.SpatialAxis.Resolution.Bounds.Limits.LoLimit	pos.angResolution;stat.min
s_resolution_max	adql:DOUBLE	NULL	arcsec	Char.SpatialAxis.Resolution.Bounds.Limits.HiLimit	pos.angResolution;stat.max
s_pixel_scale	adql:DOUBLE	NULL	arcsec	Char.SpatialAxis.Sampling.RefVal.SamplingPeriod	phys.angSize;instr.pixel
s_calib_status	adql:VARCHAR	NULL	NULL	Char.SpatialAxis.calibrationStatus	meta.code.qual
s_stat_error	adql:DOUBLE	NULL	arcsec	Char.SpatialAxis.Accuracy.StatError.Refval.value	stat.error;pos.eq
t_calib_status	adql:VARCHAR	NULL	NULL	Char.TimeAxis.calibrationStatus	meta.code.qual
t_stat_error	adql:DOUBLE	NULL	s	Char.TimeAxis.Accuracy.StatError.Refval.value	stat.error;time
em_ucd	adql:VARCHAR	NULL	NULL	Char.SpectralAxis.ucd	meta.ucd
em_unit	adql:VARCHAR	NULL	NULL	Char.SpectralAxis.unit	meta.unit
em_calib_status	adql:VARCHAR	NULL	NULL	Char.SpectralAxis.calibrationStatus	meta.code.qual
em_res_power_min	adql:DOUBLE	NULL	NULL	Char.SpectralAxis.Resolution.ResolPower.LoLimit	spect.resolution;stat.min
em_res_power_max	adql:DOUBLE	NULL	NULL	Char.SpectralAxis.Resolution.ResolPower.HiLimit	spect.resolution;stat.max
em_resolution	adql:DOUBLE	NULL	m	Char.SpectralAxis.Resolution.Refval.value	spect.resolution;stat.mean
em_stat_error	adql:DOUBLE	NULL	m	Char.SpectralAxis.Accuracy.StatError.Refval.value	stat.error;em
o_unit	adql:VARCHAR	NULL	NULL	Char.ObservableAxis.unit	meta.unit
o_calib_status	adql:VARCHAR	NULL	NULL	Char.ObservableAxis.calibrationStatus	meta.code.qual
o_stat_error	adql:DOUBLE	NULL	o_unit	Char.ObservableAxis.Accuracy.StatError.Refval.value	stat.error;phot.flux
proposal_id	adql:VARCHAR	NULL	NULL	Provenance.Proposal.identifier	meta.id; obs.proposal

Representing Metadata

Ideas for metadata

Semantics

Vocabulary

(words, definitions)

UCD

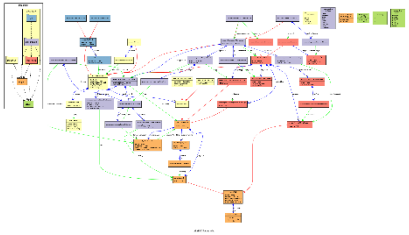
Unified Content descriptors

Data models

Utypes

VODML types

Structure



TAP schema

VOTable

Serialisation Format

Taphandle +ObsCore

Enter a TAP service URL or a keyword

Tap Nodes

- cadc SJAU
  - tap_test
  - TAP_SCHEMA
  - ivoa
    - ivoa.ObsPart
    - ivoa.ObsFile
    - ivoa.ObsCore
  - community
  - cfht
  - caom2
- *Goodies (not used yet)*

Hide tree

cadc>ivoa>ObsCore>g2hi2bqk2jz7av3d

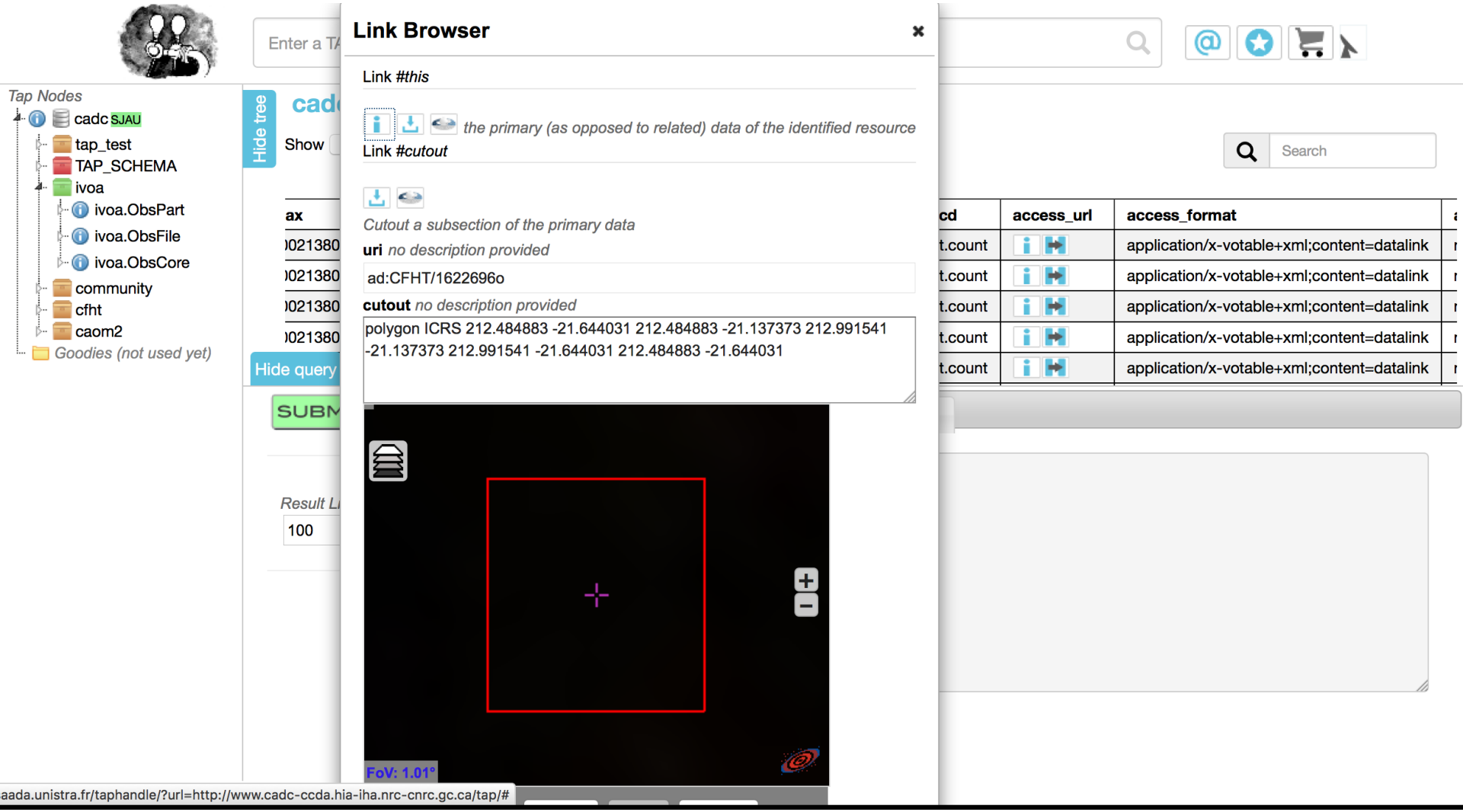
Show 10 entries

Search

obs_publisher_did	obs_collection	facility_name	instrument_name	obs_id	dataproduct_type	calib_level	obs_relea
caom:CFHT/1622696/1622696og	CFHT	CFHT 3.6m	WIRCam	1622696	image	1	2014-08-3
caom:CFHT/1622696/1622696p	CFHT	CFHT 3.6m	WIRCam	1622696	image	2	2014-08-3
caom:CFHT/1622696/1622696s	CFHT	CFHT 3.6m	WIRCam	1622696	image	2	2014-08-3
caom:CFHT/1622691/1622691s	CFHT	CFHT 3.6m	WIRCam	1622691	image	2	2014-08-3
caom:CFHT/1622689/1622689og	CFHT	CFHT 3.6m	WIRCam	1622689	image	1	2014-08-3
caom:CFHT/1622689/1622689p	CFHT	CFHT 3.6m	WIRCam	1622689	image	2	2014-08-3
caom:CFHT/1622689/1622689s	CFHT	CFHT 3.6m	WIRCam	1622689	image	2	2014-08-3
caom:CFHT/1622699/1622699og	CFHT	CFHT 3.6m	WIRCam	1622699	image	1	2014-08-3
caom:CFHT/1622692/1622692og	CFHT	CFHT 3.6m	WIRCam	1622692	image	1	2014-08-3
caom:CFHT/1622692/1622692p	CFHT	CFHT 3.6m	WIRCam	1622692	image	2	2014-08-3

Showing 1 to 10 of 100 entries

Exploring retrieved datasets



IVOA Standard ObsCore DM

- Version 1.1 update Proposed REC June 2016

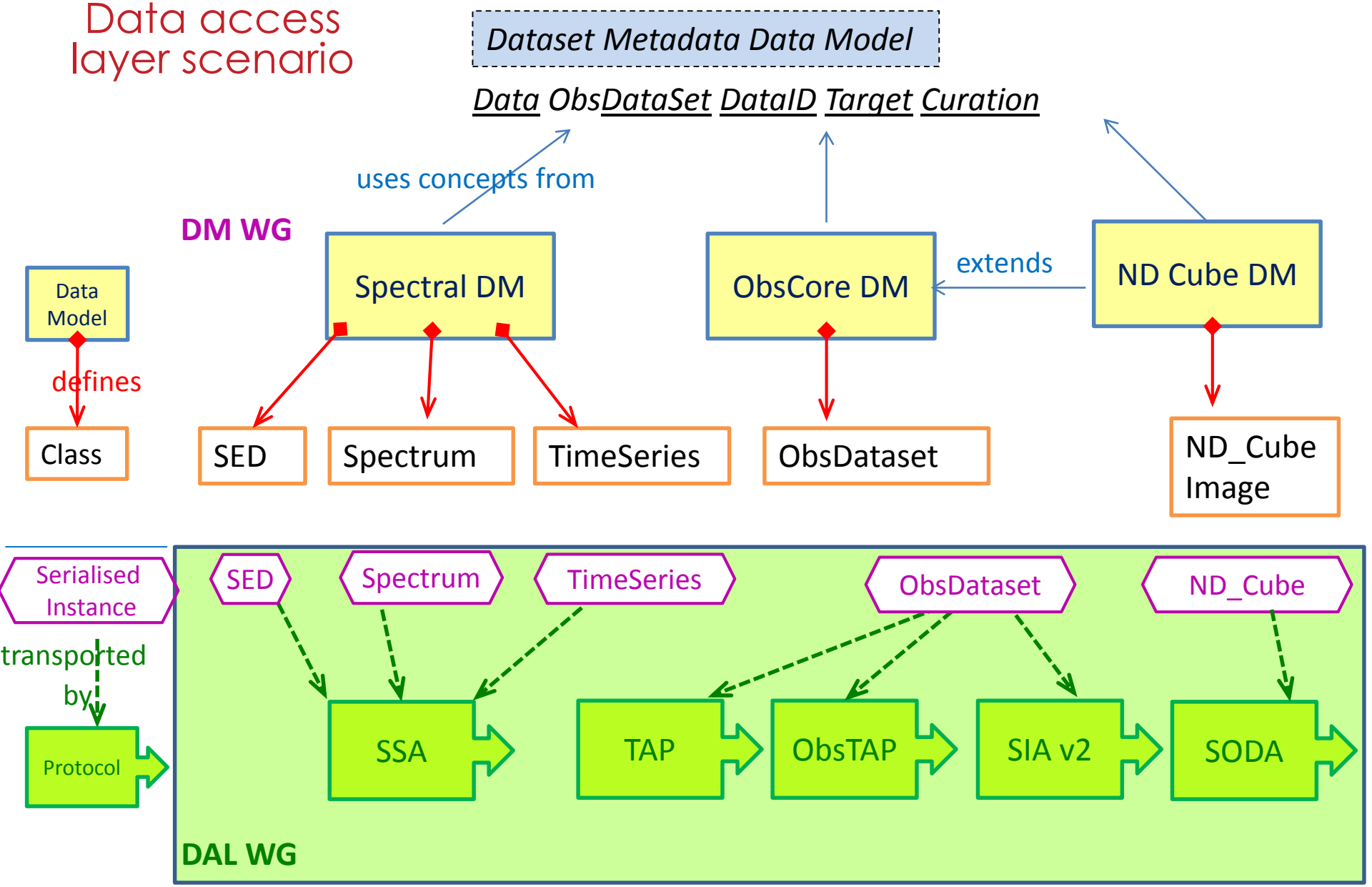
http://www.ivoa.net/documents/ObsCore/index.html

- IVOA REC version 1.0 , 2012
- Existing Implementations in TAP protocol
  - Interface via API : TapHandle 2.0

    http://saada.unistra.fr/taphandle/
- Server reference implementations

  - CADC portal
  - XcatDB XMM portal

Datamodels and Data access layer scenario



Various expressions

- A structured representation for metadata
- Different representations
  - UML class diagram metadata static description
  - TAP_schema tables definitions
  - XML document compliant to VODML.xsd schema
  - Part of serialisation documents (VOTable, others?)

Thank you
welcome to your questions
at dm@ivoa.net