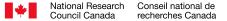


CAOM-2.5 Working Draft

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IVOA InterOp Meeting 2025a





Overview

- status of CAOM-2.5 model
 - $\circ \quad \text{VO-DML model}$
 - IVOA standard document and process
- status of CAOM-2.5 implementation
 - java libs, python libs
 - postgresql + pgsphere database
 - porting OpenCADC code to 2.5

WD-CAOM-2.5 status

- repository: <u>https://github.com/opencadc/CAOM</u>
 - should move to <u>https://github.com/ivoa-std</u> (summer)
- significant changes
 - change from implicit to explicit observation and plane identifiers (URI)
 - add ArtifactDescription table and reference from Artifact
 - support DataLink implementation
 - remove Part and Chunk from the model
 - increasingly inadequate for describing data file structure
 - improving would increase overlap with CubeDM

WD-CAOM-2.5 status

- significant changes cont.
 - changed several fields to directly use IVOA vocabularies
 - Plane.dataProductType -> product-type (was ObsCore)
 - Artifact.productType -> DataLink core (semantics field)
 - Plane.observable.ucd -> UCD1+
 - added calibration status (vocabulary) for position, energy, time, and observable axes
 - initial vocabulary could be extracted from ObsCore
 - removed Plane.position.timeDependent (boolean) in favour of Telescope.trackingMode (vocabulary)

WD-CAOM-2.5 status

- significant changes cont.
 - added metadata fields to Plane to describe radio data
 - quantities that vary across the field of view: use interval
 - added Visibility characterisation for interferometry data
 - notable: both relative and absolute energy resolution (representative value and interval bounds)
 - Plane energy includes both relative and absolute resolution:
 - resolvingPower: relative (since 2.0)
 - resolution: absolute (new in 2.5)
 - both also described by interval to describe variation across data
 - no quantities have specified units or reference frames!
 - external "profile" describes this

WD-CAOM-2.5 standardisation

- meetings with IVOA Data Model WG
 - position CAOM in the IVOA landscape
 - define scope that can be agreed upon
 - define relationship with ObsCore + extensions
- write the document
 - add latex markup to the VO-DML (definitive source)
 - able to build a nice standard document from source
 - updating text style and definitions: more than half done

WD-CAOM-2.5 standardisation

- current issues
 - draft PR to extract re-usable data types from CAOM
 - dataType: interval, point, circle polygon
 - primtiveType: uuid
 - metaChecksum algorithm requires specific numeric-to-byte conversions for interoperability
 - primtiveType: int32, int64, double (names TBD) <u>https://github.com/opencadc/CAOM/pull/31</u>
 - relationship between data model vodml-id values and VOTableutype values: vodml-ref = {prefix}:{vodml-id} == {utype}??
 <u>https://github.com/ivoa/vo-dml/pull/46</u>

C is for Common

- CAOM is intended to cover a wide range of use case
 - ret to use mission and wavelength agnostic terminology
 - try to balance specificity vs sparseness
- easy to measure which fields are populated by various missions
 - detailed report of usage of every field, broken down by telescope and instrument (Severin Gaudet)
 - analysis to gather insights current sparseness (in progress)
- hard to measure what scientists actually use

CAOM-2.5 implementation

- java repository: <u>https://github.com/opencadc/caom2</u>
 - feature branch: caom25
 - updated libraries: caom2, caom2-compute, caom2-db (new name)
 - not published to maven-central build from source
 - notable:
 - improved metaChecksum algorithm
 - core library can read & transform 2.4 observations to 2.5
 - caom2-db: contains the postgresql + pgsphere DDLs and ObsCore views
- python repository: <u>https://github.com/opencadc/caom2tools</u>
 - feature branch: CAOM25
 - not published to PyPI install from source

CAOM-2.5 implementation

- services: in the opencadc/caom2 repository and feature branch
 - torkeep: CAOM metadata curation service ported to 2.5
 - **docker image:** images.opencadc.org/caom2/torkeep:2.0-BETA
 - argus: CAOM query (TAP) service ported to 2.5
 - **docker image:** images.opencadc.org/caom2/argus:2.0-BETA
 - bifrost: CAOM DataLink service in progress (minimal work needed)
 - icewind: CAOM metadata sync tool in progress
 - intent is to be able to read from 2.4 and 2.5 source services
 - can improve sync and validation with a standard TAP API

CAOM-2.5 implementation

- repository service prototype: <u>https://ws.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/caom25/torkeep/</u>
- query (TAP) service prototype: <u>https://ws.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/caom25/argus/</u>
- content currently limited to LOTSS radio data
 - once icewind port is complete, we will migrate a sampling of other content to support the IVOA standardisation process
- ivoa.ObsCore and ivoa.ObsCore_radio implemented as views in CAOM-2.5 database, so minimal effort to support

Draft ObsCore + radio implementation

- ObsCore additions (so far)
 - s_fov_min (no max)
 - s_resolution_min
 - s_resolution_max
 - em_resolution (absolute, !f)
 - em_resolution_min
 - em_resolution_max
 - t_exptime_min
 - t_exptime_max
- missing by accident
 - tracking_mode

- ObsCore_radio
 - s_largest_angular_scale_min
 - s_largest_angular_scale_max
 - uv_distance_min
 - uv_distance_max
 - uv_distribution_ecc
 - uv_distribution_fill
- not included
 - instr_*

All code is open-source – docker images are ready to use

Questions?