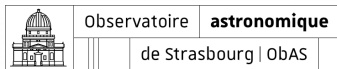
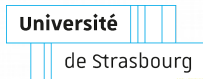


# New Simbad ConeSearch implementation

Grégory Mantelet<sup>1</sup>, Anaïs Oberto<sup>1</sup>

<sup>1</sup>CDS (Centre de Données astronomiques de Strasbourg)

11th May 2023



# □ Table of Contents

New implementation

New features

Availability



# □ Implementation - Why new?

## What was “wrong” with the previous implementation?

- Slow query responses
- No other output formats than VOTable
- No sorting options (by default on distance from target)
- Deprecated UCD1 (instead of UCD1+)
- Old code: Java Servlets



# □ Implementation - Why fast?

- To make a quick interrogation of Simbad on a given sky position
  - Simbad data daily changes => not possible to have a cache or snapshot.
  - Filter by number of references instead of distance
  - *e.g. Simbad pointer in Aladin returns the source with the max. number of ref.*
- So, should be as fast as possible which was not the case..



# □ Implementation - Evolution

- **Programming:**
  - Java 11
  - Web API framework: [Quarkus](#)
  - [Gradle](#) for dependencies management
- **Columns metadata:**
  - TAP\_SCHEMA
  - Use same tables and columns as with Simbad-TAP
- **Performance improvement:**
  - Reactive programming
  - Native compilation



# □ Features - Formats

- **Multiple response formats**
  - Parameter RESPONSEFORMAT (*defined by DALI*)
  - HTTP header Accept
  - VOTable (*last version: 1.4*)
  - JSON
  - FITS
  - CSV



# □ Features - Size

- **Response size limit**
  - Parameter MAXREC (*defined by DALI*)
  - 0 to get only metadata
  - Upper limit defined by the server



# □ Features - Sort

- **Sorting options**

- 2 parameters: ORDER\_BY and ORDER\_DIR
- ORDER\_BY with the name of one of the output columns  
(*default: distance*)
- ORDER\_DIR: ASC (*default*), DESC





# □ Features - Links

- **Columns link:**
  - Object name/identifier: link to the Simbad Web page of the object (e.g. *M1*)
  - Object type: link to the online object type description (e.g. *SNR*)
  - Available only in VOTable (*LINK* element) and JSON formats
  - Compatible with Aladin



# □ Features - Parameters

SCS-1.03, sec. 2.:

*If a query includes an optional parameter, either one specified by this document or not, that is not supported by the service implementation, **the service must ignore that parameter.***

In this implementation:

- Incorrect parameter => ERROR
  - e.g. ORDER\_BY or SORT\_BY ; if SORT\_BY is used, we want an error
- Incorrect parameter value => ERROR
  - e.g. unknown column name when ordering rows
- In both case, we need to see the error. Otherwise we will get a result which does not match our expectations.
- ***Discussed during the Cone Search Splinter: this paragraph should be updated in SCS-1.1.***

# Features - Data origin

- **Extra response metadata:**

Inspired from [DALI-1.1](#) and [draft note about data origin](#) from DCP.

INFO name	Value	Description
<b>standardID</b>	ivo://ivoa.net/std/conesearch	IVOID of the service specification
<b>service_protocol</b>	Simple Cone Search 1.03-extended	Used access protocol and version
<b>publisher</b>	CDS/SIMBAD	Data publisher
<b>request</b>	<a href="https://simbad.cds.unistra.fr/cone/?RA=0.0&amp;DEC=0.0&amp;SR=5.0&amp;VERB=1&amp;MAXREC=10&amp;ORDER_BY=distance&amp;ORDER_DIR=ASC&amp;RESPONSEFORMAT=votable">https://simbad.cds.unistra.fr/cone/?RA=0.0&amp;DEC=0.0&amp;SR=5.0&amp;VERB=1&amp;MAXREC=10&amp;ORDER_BY=distance&amp;ORDER_DIR=ASC&amp;RESPONSEFORMAT=votable</a>	HTTP request URL
<b>request_date</b>	2023-04-17T15:30:54.431033294+02:00	Query execution date
<b>contact</b>	cds-question@unistra.fr	Publisher email address
<b>QUERY_STATUS</b>	OK	Successful query



# □ Features - UCD

- Use **UCD1+**
  - ID column: `meta.id;meta.main` instead of `ID_MAIN`
  - RA: `pos.eq.ra;meta.main` instead of `POS_EQ_RA_MAIN`
  - DEC: `pos.eq.dec;meta.main` instead of `POS_EQ_DEC_MAIN`



# Features - Extra

- **Health**
  - /availability **possible**
- **Capability**
  - /capabilities **possible**
- **OpenAPI**
  - Document describing the Web API (e.g. parameters, HTTP response codes)
- **Online documentation**
  - Generated with **Swagger**
  - Generated from the OpenAPI document
  - Lets interactively run queries

Swagger UI | /openapi | Explore | simbad-conesearch 2.0 SWAGSHOT (powered by Quixia 2.3.1 Final)

## Simbad ConeSearch API (development) 0.0 OAS3

Simple REST service implementing the IVOA protocol named ConeSearch.

CDS - Website  
Send email to CDS

Servers  
<http://simbad.cds.unistra.fr/cds>

### ConeSearch

Run ConeSearch queries.

GET / Submit a ConeSearch query on the Simbad database.

Parameters

Name	Description
<b>DEC</b> * <small>required</small> number (float) <small>query</small>	The declination of the search cone's center in decimal degrees. It must be between -90 and 90. Example: 0 <input type="text" value="0"/>
<b>MAXREC</b> integer (int32) <small>query</small>	Maximum number of rows to return. 0 to only get metadata. Example: 2000 <input type="text" value="2000"/>
<b>ORDER_BY</b> string <small>query</small>	Available values : B, O, H, L, J, K, R, U, V, coord, dim, distance, main_id, morph_type, nb_ref, oids, oidsref, otype, otype_label, pin, pin_ref, radius, sq_type Default value : distance <b>Examples:</b> Distance from cone center <input type="text" value="distance"/>
<b>ORDER_DIR</b> string <small>query</small>	Available values : ASC, DESC Default value : ASC <b>Examples:</b> Ascending order <input type="text" value="ASC"/>
<b>RA</b> * <small>required</small> number (float) <small>query</small>	The right ascension of the search cone's center in decimal degrees. It must be between 0 and 360. Example: 0 <input type="text" value="0"/>
<b>RESPONSEFORMAT</b> string <small>query</small>	Desired output format. It should be a MIME-type or a shortcut. <b>Examples:</b> VOTable shortcut <input type="text" value="VOTable shortcut"/>

Link: ... /cone/help/



# □ Status

- **Old service:** *online (but closed at sometime)*
- **New service:** *online*
- **Registry:** *in progress*
- **Fallback parameter (v1.03):** *in progress (why note the VERSION parameter from DALI)*
- **Aladin & Topcat with new version:** *compatible*



# □ Availability

- Service: <https://simbad.cds.unistra.fr/cone>
- OpenAPI:  
<https://simbad.cds.unistra.fr/cone/openapi/>
- Documentation:  
<https://simbad.cds.unistra.fr/cone/help/>

