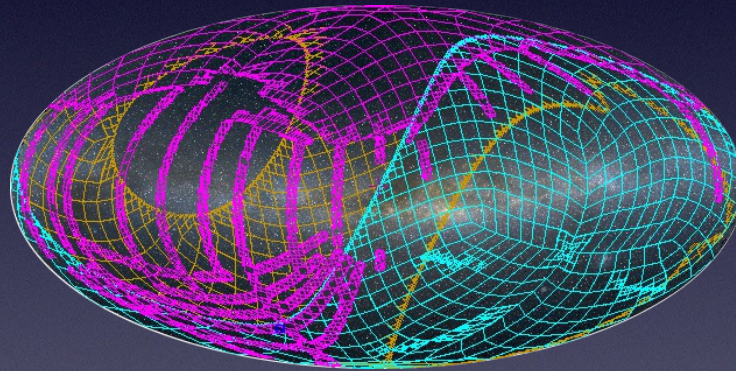


MocServer

=

*Who & where
in a few milliseconds*



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MOC Server

1. Remember me, **what's a MOC** ?

2. **Why a server** of MOCs ?

3. **How it works** ?

4. **Demonstration**

5. What about the **VO registry** ?

6. Conclusions



What's a MOC ?

- A MOC : **a simple and efficient method for describing a sky region**
- Principle : MOC = list of HEALPix cell indexes of the region, grouped hierarchically

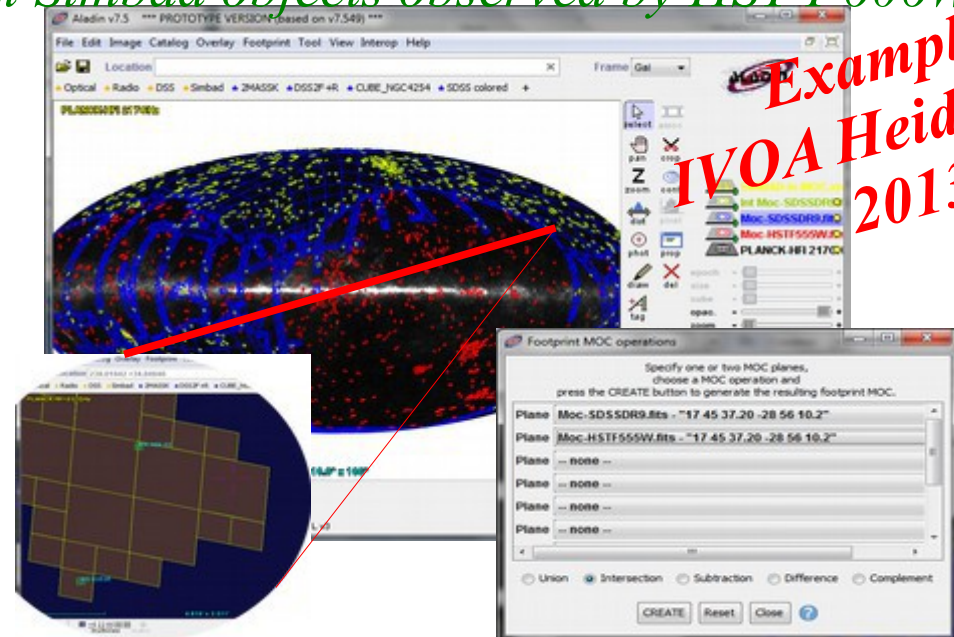


The goal ?

- Compare sky regions as fast as possible

« Please give me all Simbad objects observed by HST F606W and SDSS DR9 »

1. Load
MOC-HST F606W
MOC-SDSS DR9
 2. Compute
MOC intersection
 3. Query Simbad
by MOC
- => Realized in **5s**



Example
IVOA Heidelberg
2013

Why a MOC server ?

1) *Which data collections are localized in this sky region ?*

2) *What is their coverage ?*

In less of an half second ! Please !

Data collections = 15 000 tables, catalogs, DB, pixel surveys, ...

Region = Any sky region, possibly very large, possibly segmented, not necessary convex...

For whom ?

- **VO clients** & Cie
- New usage : very very fast requests => continuous update => allows **dynamic tools**
- Already 2 prototypes :

Aladin Lite
« multiMoc »

Aladin Desktop
beta (>v8.152)

The screenshot displays the Aladin Desktop interface. On the left, a search bar contains the text 'color'. Below it, a list of search results is shown, including 'P/PLANCK/LFI/color' and 'P/PLANCK/HFI/color'. A large blue arrow points from the text 'Aladin Desktop beta (>v8.152)' to the search bar. In the center, a large image of a galaxy is displayed, with a red crosshair and the text 'Demo in 1 mn' overlaid. On the right, a 'Catalogue' section shows a list of search results, including 'J/MNRAS/375/68/catalog' and 'J/MNRAS/419/2095/hmxb'. The interface also shows a search bar with 'MNRAS' and a 'Showing 1 to 23 of 23 entries (filtered from 317 total entries)' message.

How ?

- A Tomcat **servlet** (just 3 000 java line code)
- Containing the **15 000 MOCs in memory** (~400Mo)
- **Queryable by region** (circle, polygon or MOC) via **HTTP GET** or POST
- Provides **the ID list** (ivorns) of the data set found in the region (format : ASCII or JSON)...
- ...Or **the union** - resp. **the intersection – of the datasets MOCs** (format : FITS or JSON)

Examples

- 55 ms** • IDs of all data sets in 5 deg around M31:
`http:/...? POS=10.68,41.273 & SIZE=10`
- 53 ms** • IDs of all data sets in a polygon:
`http:/...? stc=Polygon 57.376 24.053 56.391 ... 56.616 24.290`
- 21 ms** • IDs of HST collections overlapping SDSS observations:
`http:/...? ivorn=*HST* & url=http://urlMocSDSS`
- 7 ms** • MOC of SCUBA2 observations:
`http:/...? ivorn=CDS/P/SCUBA2/850em & get=moc`
- 492 ms** • MOC union of all A&AS tables:
731 tables `http:/... ? ivorn=CDS/J/A+AS/* & get=moc`
- 50 ms** • MOC of the SDSS & GALEX intersection
`http:/... ? ivorn=*SDSS9/g,*GR6/AIS/FUV & get=imoc`

MocServer extension

- Associate some « **Properties** » to each data collection (id, title, description, key words ...)
=> vocabulary « a la » **ObsCore IVOA**
(ex : publisher_id, obs_title, ...)
- Goal: to allow **more useful client interface** (data set titles rather than simple ID...)
- To allow **dataset filtering facility**

Examples

5 ms

- Properties of all data sets provides by SSC XMM:
http://...? ivorn=SSC* & get=record & fmt=json

17 ms

- IDs of all Radio data sets:
http://...? obs_regime=Radio

*44 ms
46 cats*

- MOC of all Seyfert data set
http://...? obs_astronomy_kw=Seyfert* & get=moc

Live demo...

1) Moc Server

=> alasky.unistra.fr/MocServer/query

2) Aladin Lite « MultiMoc »

=> cds.unistra.fr/~boch/multimoc-AL

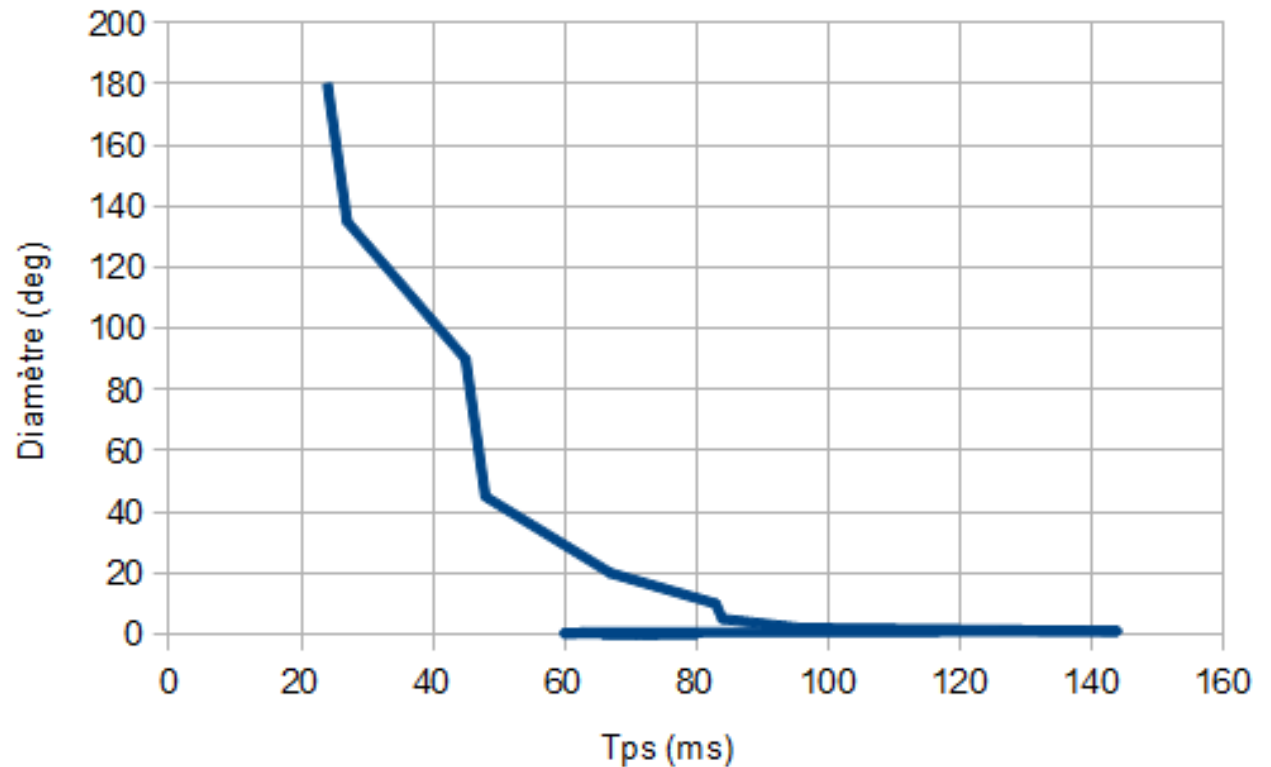
3) Aladin beta (>8.150)

=> aladin.unistra.fr/java/AladinBeta.jar



MOC subtleties...

Diam. CS (deg)	Time (ms)	Nb of datasets
0,001	72	112
0,005	74	112
0,01	71	112
0,05	66	129
0,1	80	142
0,25	60	201
0,5	63	314
1	144	598
2	96	1099
5	84	1951
10	83	3335
20	67	5011
45	48	7742
90	45	10842
135	27	13898
180	24	14568



1) Larger is the region, faster is the response

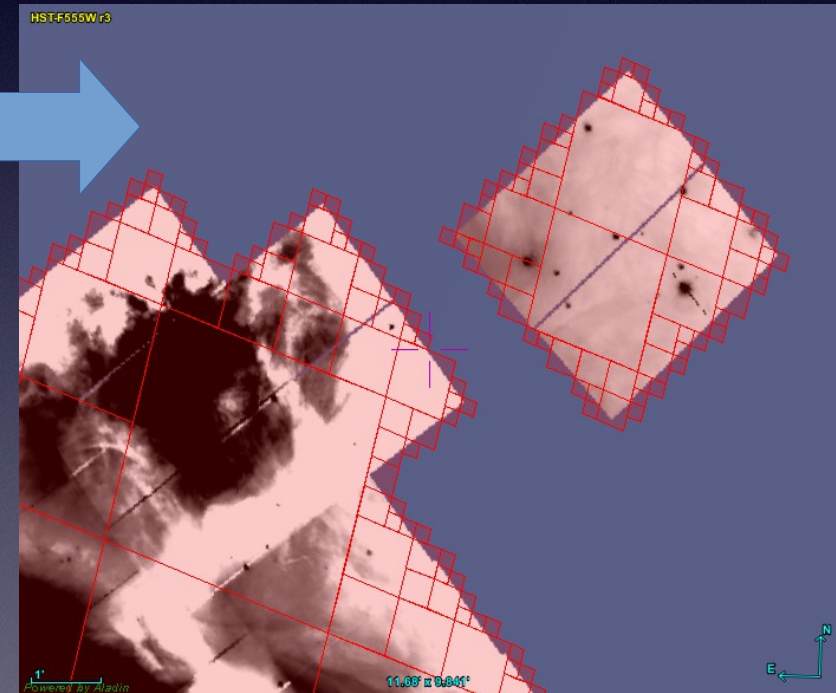
2) If the region is smaller than the MOC order, the response time is constant

MOC accuracy

- **The MOC order** determine its accuracy (order = smaller MOC cell)

Rem : The Moc server contains heterogenous orders

Id	Order	Precision
CADC/P/HST	14	12.9 arcsec
CDS/B/SIMBAD	10	3.4 arcmin
CDS/I/239/tyc_main	9	6.8 arcmin



*Keep in mind that a MOC is no more than an «**approximative coverage**» (upper limit) of the associated data set.*

How MocServer is populated ?

- MocServer data = **just a collection of file pairs** (MOC,prop) in a directory
- Presently, **harvested by a few scripts** retrieving MOC & prop from:
 - VizieR => TAP requests
 - HIPS nodes (CDS, IRAP, SSC XMM, AMIGA)
 - Simbad => dedicated URLs
- **Will also use VO registry when MOCs will be listed**

Why not use directly VO registry ?

Why not ? => VO registries will need to become MOC-able

1. VO Registry manages mixed high (catalogs, surveys) and low (tables, wave band survey) data set items ...

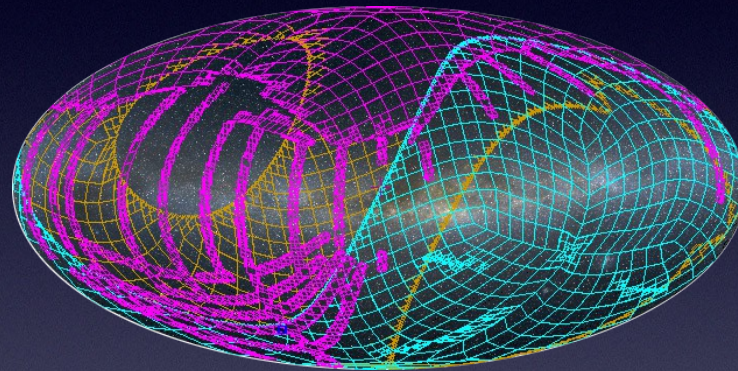
=> VO registry will have to homogenizes their content.

2. VO registries DB will need to :

a) either implement MOC lib + Healpix lib

b) or create a HEALPix index internally (ex : H3C)

Thanks! Questions ?



Official MocServer URL
feel free to use it :

alasky.unistra.fr/MocServer/query

Aladin Lite « multimoc »

The screenshot displays the Aladin Lite multimoc interface. At the top center, a search bar contains the text "color". Below it, a list of data sources is shown under the heading "HiPS image". The central panel features a dark field with a blue-tinted image of a spiral galaxy, marked with a pink crosshair. Above the image, the J2000 coordinates "13 28 38.975 +47 02 24.82" are displayed. To the right of the image are zoom controls (+ and -) and a full-screen icon. Below the image, the field of view "FoV: 27.23'" is indicated. On the right side, another search bar contains "MNRAS", followed by a "Catalogue" section listing various MNRAS entries. The interface is clean and functional, designed for astronomical data exploration.

Search: color

HiPS image

- ivo://SSC/P/XMM/PN/color
- P/2MASS/color
- P/AKARI/FIS/Color
- P/allWISE/color
- P/DSS2/color
- P/Fermi/color
- P/GALEXGR6/AIS/color
- P/GALEXGR6/AIS/color/old
- P/Mellinger/color
- P/PLANCK/HFI/color
- P/PLANCK/LFI/color

Showing 1 to 15 of 15 entries
(filtered from 102 total entries)

J2000 13 28 38.975 +47 02 24.82

FoV: 27.23'

Search: MNRAS

Catalogue

- J/MNRAS/375/68/catalog
- J/MNRAS/380/1608/catalog
- J/MNRAS/384/1178/table1
- J/MNRAS/395/255/galaxies
- J/MNRAS/395/255/groups
- J/MNRAS/396/223/qsos
- J/MNRAS/399/2231/catalog
- J/MNRAS/405/2302/table4
- J/MNRAS/410/166/galaxies
- J/MNRAS/410/860/table1
- J/MNRAS/419/2095/hmxb

Showing 1 to 23 of 23 entries
(filtered from 317 total entries)

cds.unistra.fr/~boch/multimoc-AL

Aladin Desktop beta

aladin.unistra.fr/
AladinBeta.jar

Server selector

Others HiPS File all VO Watch FoV... Tools...

Image servers

Aladin images SkyView UKIDSS Sloan DSS... VLA... Archives... Others...

Catalog servers

All VizieR Surveys Missions SIMBAD NED MOC SkyBot Others..

Progressive surveys (HiPS) ?

Target (Gal, name) 165.6844 -22.6692

Radius 1.071°


SDSS Mellinger colored (c) Axel Mellinger. Permission is granted fo... CFHTLS HST HST-F110W CADDC (get Moc) HST-F160W r3 CADDC (get Moc) HST-F255W r3 CADDC (get Moc) HST-F300W CADDC (get Moc) HST-F450W r3 CADDC (get Moc) HST-F475W r3 CADDC (get Moc) HST-F555W r3 CADDC (get Moc) HST-F606W r3 CADDC (get Moc) HST-F625W r3 CADDC (get Moc) HST-F702W r3 CADDC (get Moc) HST-F814W r3 CADDC (get Moc) HST-F850LP r3 CADDC (get Moc) GOODS PHAT Gamma-ray X RASS 0.5-2.4 keV IRAP/CADE RASS 0.1-0.4 keV IRAP/CADE RASS 0.1-2.4 keV IRAP/CADE INTEGRAL XMM Radio Gas-lines UV Infrared Cube

Default format: Preview (jpg|png) Full pixel dynamic (fits)

Reset Clear SUBMIT Close ?

Moc Server

alasky.unistra.fr/
MocServer/query



The screenshot shows a web browser window with the address bar containing "alasky.unistra.fr/MocServer/query?". The page title is "MocServer / Demonstrator / v1.75 - June 2015". The page content includes a logo for the Centre de Données Astronomiques de Strasbourg, a description of the MOC Server tool, and three search methods: Cone search, Basic STC search, and Inline MOC search. Each method includes a brief description and a search form with input fields and a "Go" button.

Fichier Édition Affichage Historique Marque-pages Outils ?

Moc Server

alasky.unistra.fr/MocServer/query?  Rechercher

Les plus visités Débuter avec Firefox

 **MocServer / Demonstrator** / v1.75 - June 2015
(Doc & demo - [Examples](#) - [Browser](#) - [Admin](#))
CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

MOC Server tool for retrieving as fast as possible the list of astronomical data sets (catalogs, surveys, ...) having at least one observation in a specific sky region. The default result is an IVORN list (publisher_id). MOC Server is based on Multi-Order Coverage maps (MOC) described in the [IVOA REC](#) standard.

This form allows one to discover, test and check the various HTTP parameters supported by the MocServer remote API.

Search by regions

1) Cone search

MOC server can be queried by SIMPLE CONE SEARCH syntax. The search region is a circle on the sky:
RA,DEC must be expressed in degrees (ICRS), SR in degrees.

RA= DEC= SR=

2) Basic STC search

MOC server can be queried via a basic STC syntax. The search region is a STC string:
This version only supports Circle & Polygon in ICRS

stc=

3) Inline MOC search

MOC server can be queried by MOC string. The search region is a MOC expressed as a string.
MOC must be a string following the ASCII or JSON syntax

moc=