HiPS, Aladin Lite and the MOCServer as core components of a data portal

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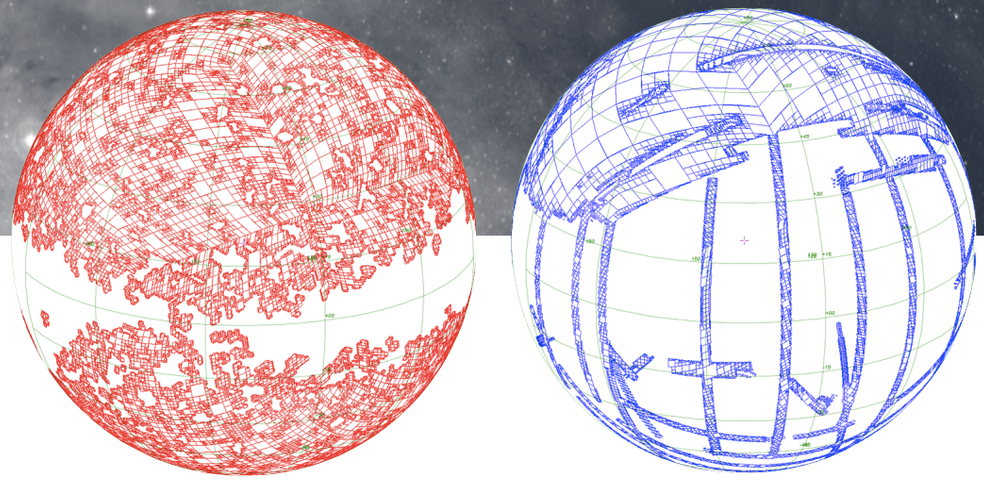
Plan

- Let’s build a data portal with HiPS, Aladin Lite and the MOCServer
  - Discovery: locate datasets of interest
  - Filter datasets
  - Preview data
  - Access data

MOCServer (1/2)



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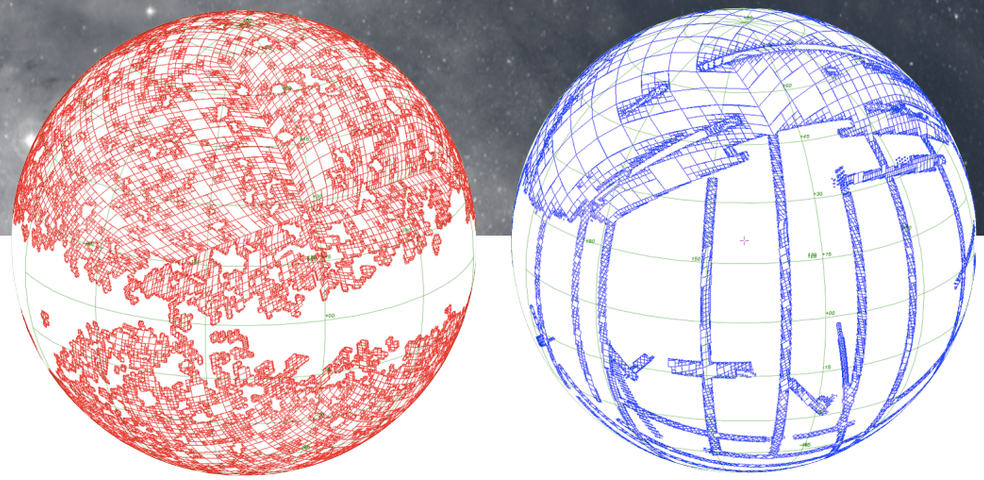

- MOC
  - IVOA standard to describe a dataset coverage
  - allows for fast comparison of coverages
  - based on HEALPix tessellation

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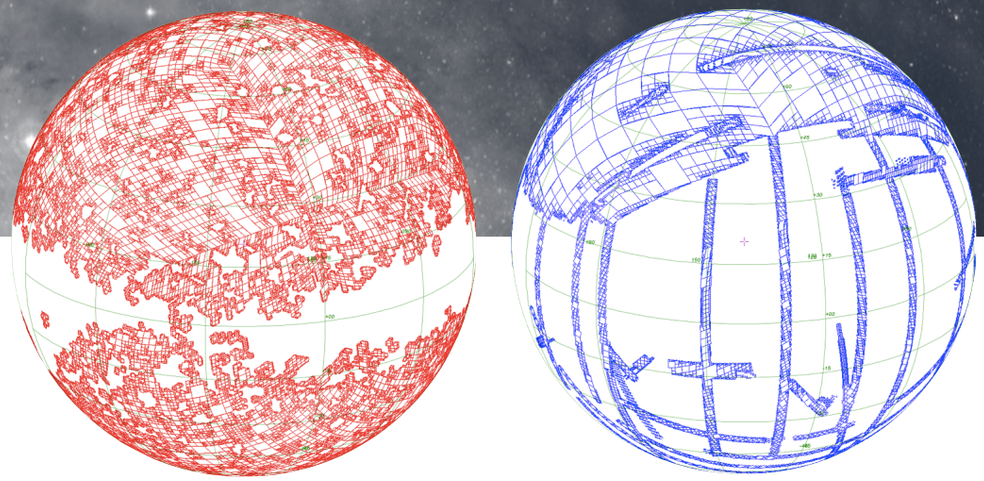

- MOC
  - IVOA standard to describe a dataset coverage
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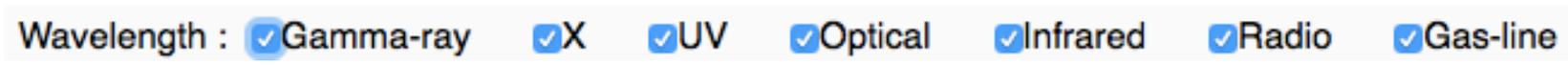
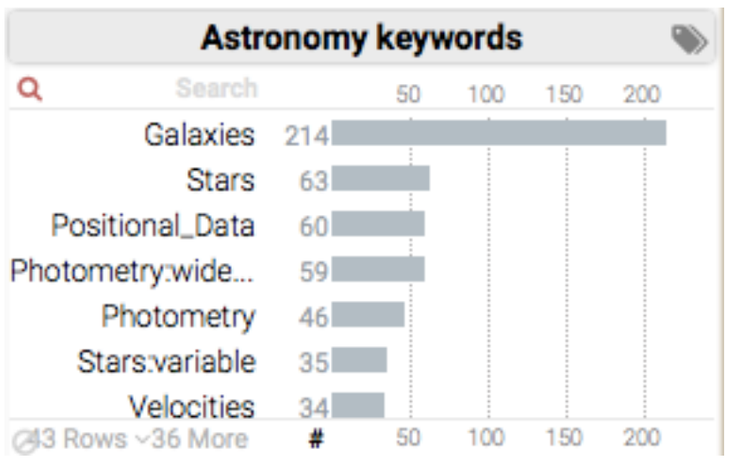
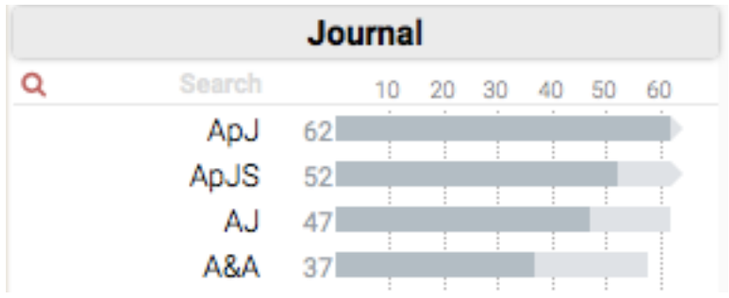
- MOCServer
  - collection of 15,000 MOCs for:
    - all image HiPS published by CDS
    - all VizieR tables with positions
    - Simbad
  - queriable by cone, polygon, MOC

MOCServer (2/2)

- spatial indexation
  - which data collections are available in this sky region?
    - *eg:* image HiPS in a 5 degrees cone around M31
      http://alasky.unistra.fr/MocServer/query?RA=10.68&DEC=41.273&SR=10&data_product_type=image
      - fast: spatial query <100ms
- metadata provider
  - allows for facets creation







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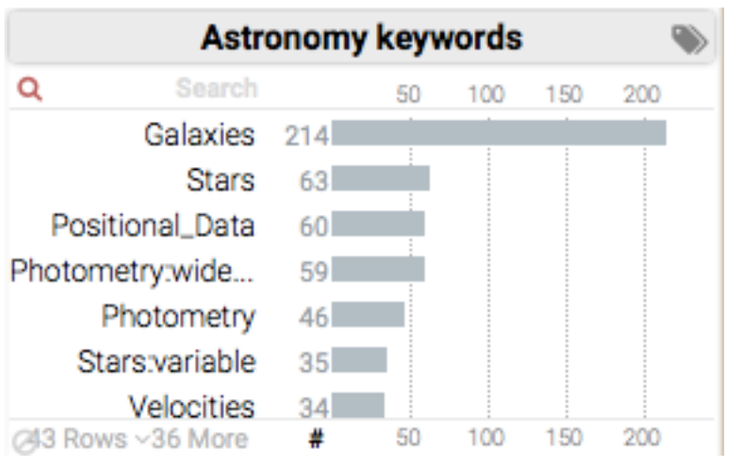

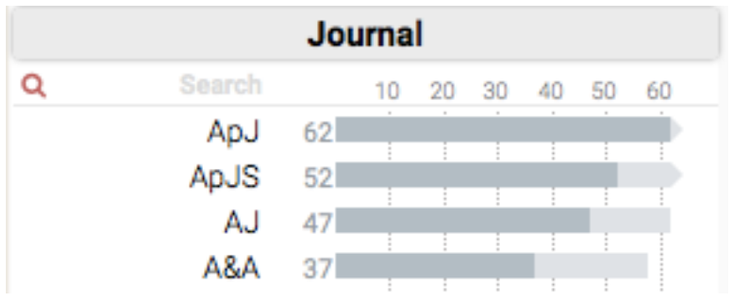

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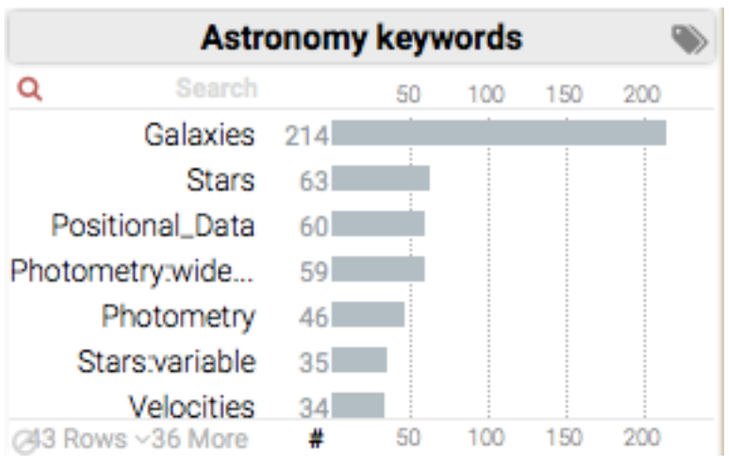
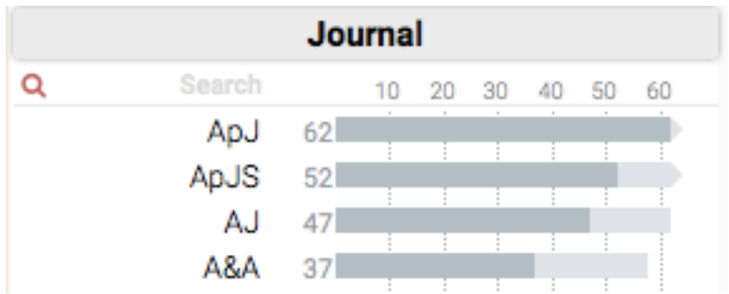
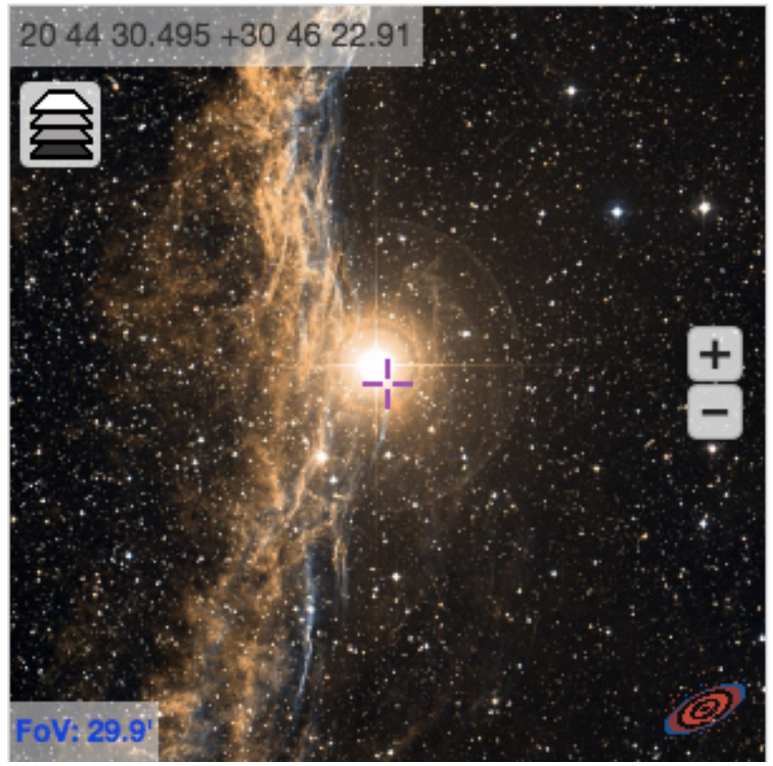




Filtering

Aladin Lite

- Lightweight sky atlas in the browser
- HiPS visualizer
- Easy to embed
- Controllable through a JS API



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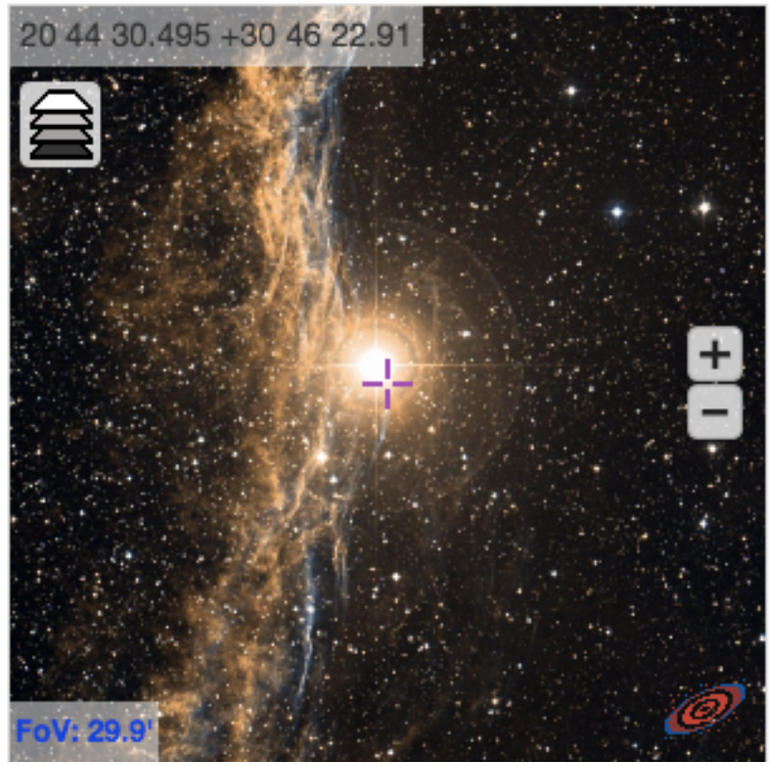


Preview
Access to data

Portal demonstration

Target:

M33

J2000 position: 01 33 50.904 +30 39 35.79

Images

193 HiPS images available around 01 33 50.904 +30 39 35.79 :

Wavelength : Gamma-ray X UV Optical Infrared Radio Gas-line

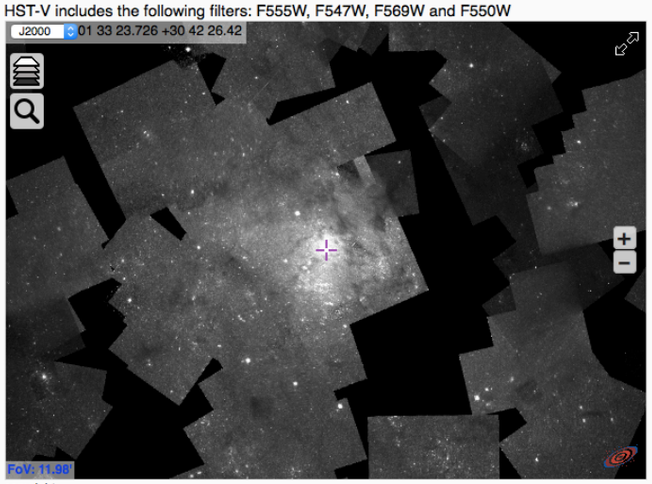
Show : All HiPS Most popular

Filter: continuous update

title	wavelength	Sky fraction
and F342W		0.02 %
HST-V includes the following filters: F555W, F547W, F569W and F550W		0.02 %
HST-I includes the following filters: F814W, F791W, F785LP and F775W		0.03 %
HLA-wideV includes the following filters: F606W and F600LP		0.05 %
HST-wideV includes the following filters: F606W and F600LP		0.06 %
HLA-I includes the following filters: F814W, F791W, F785LP and F775W		0.07 %
SCUBA 450um emission maps	Radio	0.31 %
		0.82 %
SCUBA 850um emission maps	Radio	0.9 %
SCUBA 850um emission maps - extended dataset	Radio	0.99 %
SCUBA2 450um observations	Radio	1.75 %
SCUBA2 850um observations	Radio	1.8 %
XMM-Newton stacked EPIC images		5.06 %
Arches PN Colored		5.31 %
X-ray images on band 0.5-1Kev		6.69 %
X-ray images on band 1-2Kev		6.69 %

Showing 193 entries

HST-V includes the following filters: F555W, F547W, F569W and F550W



copyright

share thumbnail update

Catalogues

450 Vizier Catalogs

Wavelength: Infrared 96, Gamma-ray 1, X-ray 73, Uv 20, Optical 277, Radio 64

Astronomy keywords: Galaxies 214, Stars 63, Positional_Data 60, Photometry:wide... 59, Photometry 46, Stars:variable 35, Velocities 34

#rows

popularity

19.23M	AllWISE Data Release (Cutri+ 2013) (allwise) Quickview
1.925M	The USNO-B1.0 Catalog (Monet+ 2003) Quickview
1.193M	VizieR META catalogue (METAobj) Quickview
1.193M	VizieR META catalogue (ReadMeObj) Quickview
1.018M	WISE All-Sky Data Release (Cutri+ 2012) (wise) Quickview
1.014M	UCAC4 Catalogue (Zacharias+, 2012) Quickview
705.9k	NOMAD Catalog (Zacharias+ 2005) Quickview
643.6k	The Guide Star Catalog, Version 2.3.2 (GSC2.3) (STScI, 2006) Quickview
311.3k	The HST Guide Star Catalog, Version 1.2 (Lasker+ 1996) Quickview
254.7k	UCAC2 Catalogue (Zacharias+ 2004) Quickview
214.3k	Carlsberg Meridian Catalog 15 (CMC15) (CMC, 2011) (cmc15) Quickview
174.3k	XPM Catalog of positions and proper motions (Fedorov+ 2011) (xpm) Quickview
174.1k	The Initial Gaia Source List (IGSL) (Smart, 2013) (igsl3) Quickview
171.6k	The USNO-A2.0 Catalogue (Monet+ 1998) Quickview
170.6k	The PPMXL Catalog (Roeser+ 2010) Quickview

Year

Mission: ROSAT 17, XMM 10, IRAS 8, Einstein 8

Associated data: timeSerie 19, image 11, spectrum 10

Journal: ApJ 71, ApJS 64, AJ 62, A&A 58

Sky fraction

Modular components

- Each component is independent
- Has no knowledge of other components
- Interactions between components through a message bus
  - SAMP-like, but within the web page
  - *postal.js* pub/sub library

```
postal.subscribe({
                topic: "table.load.votable",
                callback: function(data, envelope) {
                    self.aladin.addCatalog(A.catalogFromURL(data.url,
{name: data.name, onClick: 'showTable'}));
                }
            });
```

```
postal.publish({
              topic: "table.load.votable",
              data: {url: 'http://.../table.vot', name: 'myTable' }
               });
```

Extension to a VO Portal

- IVOA-registered resources can describe their associated MOC

```
<coverage>
    <footprint ivo-id="ivo://mocivod">
      http://alasky.u-strasbg.fr/footprints/cats/vizier/I/221?
      product=MOC&amp;nside=512</footprint>
    <waveband>Optical</waveband>
</coverage>
```

- currently only some of the CDS resources have a MOC attached to the coverage in the VO registry
  - VizieR catalogues
- MOCServer could ingest non-CDS IVOA resources exposing their MOC
- Granularity of resources in the registry?
  - Catalogues vs. tables level

Conclusion

- HiPS, Aladin Lite and MOC Server allow for creation of a data portal in the browser
  - easy to develop (HTTP queries, JSON response)
  - interactive and fast
- This approach could be extended to integrate other VO resources

Links

- Aladin Lite
  - General doc: aladin.u-strasbg.fr/AladinLite/doc/
  - API doc
    - aladin.u-strasbg.fr/AladinLite/doc/API/
    - examples: aladin.u-strasbg.fr/AladinLite/doc/API/examples/
    - *Build a sky chart* tutorial: tiny.cc/AL-tutorial
- MOC and MOCServer
  - MOC IVOA standard: ivoa.net/documents/MOC/
  - Query the MOCServer: alasky.unistra.fr/MocServer/query
- HiPS
  aladin.u-strasbg.fr/hips/