

ProvHiPS :

A ProvTAP service for providing
IVOA provenance metadata
for HiPS

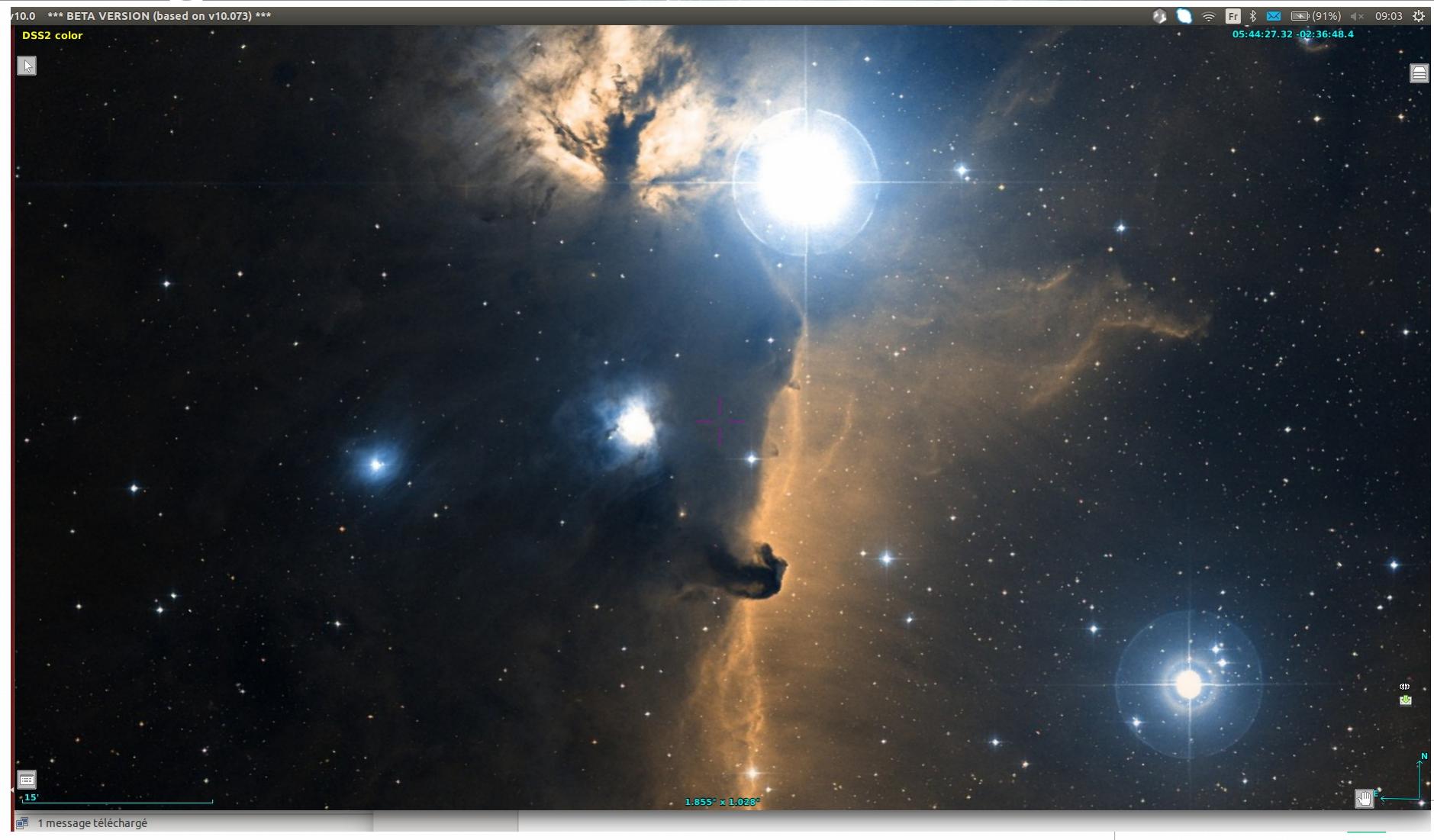


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on behalf of the « provenance datamodel »
author team of the IVOA



HiPS : hierarchical multi-resolution organisation of the data



HiPS : increasing resolution

v10.0 *** BETA VERSION (based on v10.073) ***

Aladin v10.0

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Available data → 2 Command DSS2 SDSS 2MASS WISE GALEX PLANCK AKARI XMM Fermi Gaia Simbad NED +

DSS2 color

Collections → 2279
Image → 407
Data base → 5
Catalog → 21414
Cube → 10
Ancillary → 66
Outreach → 43
Others → 846
Problems → 2

Last news

New HiPS available:

- IPHAS DR2 r and halpha (Feb 2019-CDS)
- HIPASS cube (Feb 2019-CDS)
- PanSTARRS v band (Jan 2019-CDS)
- DECaLS-DR5 g band (Nov 2018-CDS)
- UKIRT Hemisphere Survey, UHS DR1 J-band WFCAW (6 oct 2018 - WFAU)

✓ Ok

select
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filter
cross
x-y
rgb
assoc
crop
cont
pixel
prop
del

CDS/B/DSS2/color

epoch
size
dens.
opac.
zoom

SAO07046° Adjust the zoom level of selected views

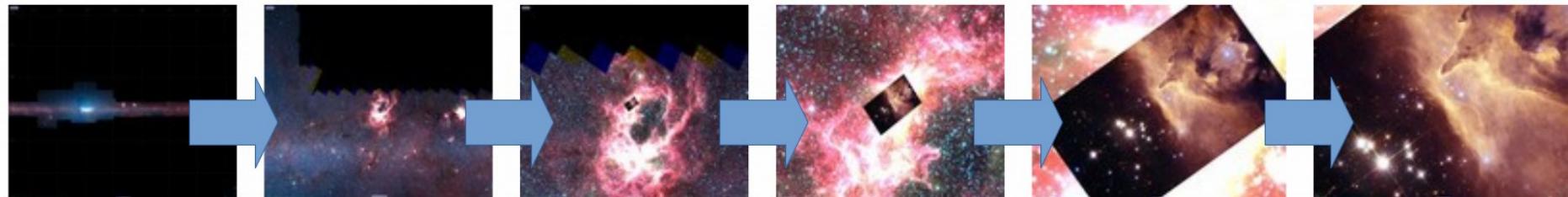
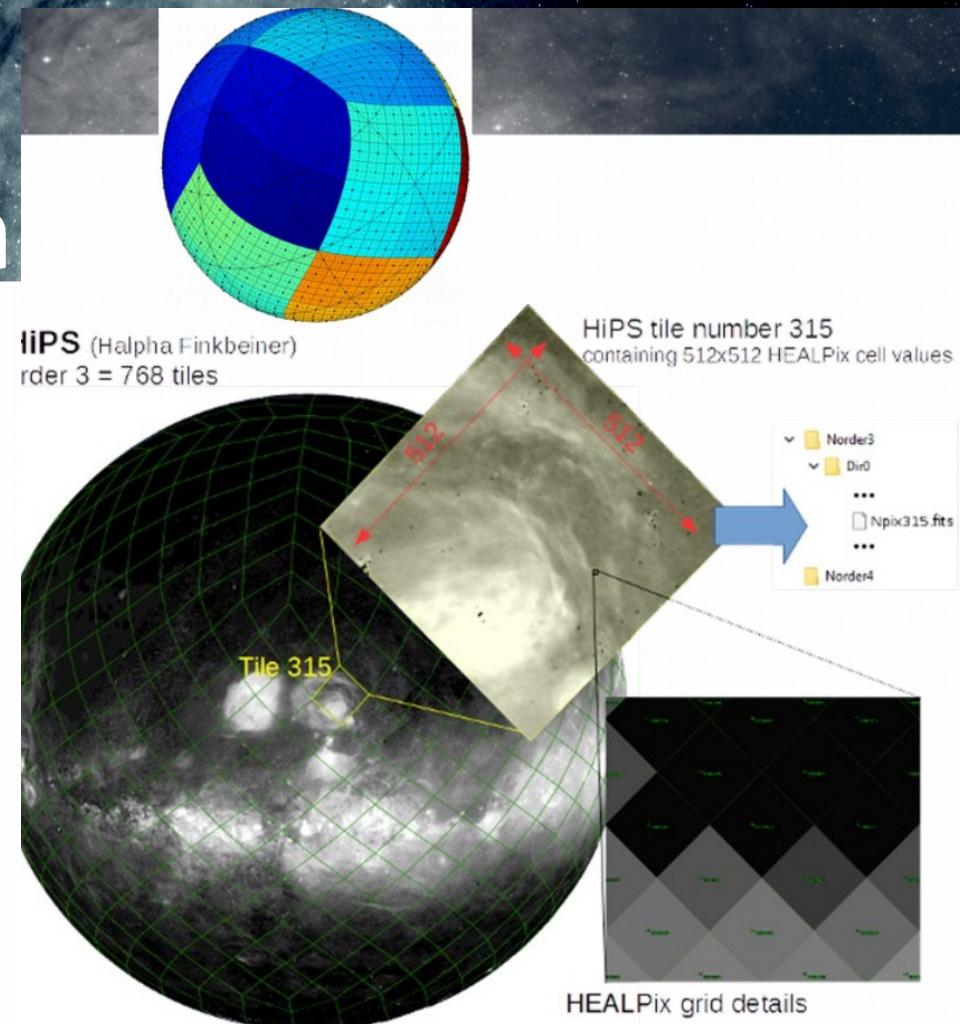
21.2' × 14.93'

N
E
S
W

exp sort view scan
grid study work north hor multiview match

The screenshot shows the Aladin v10.0 software interface. The main window displays a star field with several prominent features: a large blue nebula on the left, a bright white star in the center, and a long, thin orange filamentary structure extending towards the right. A magenta crosshair is centered on one of the stars. The top menu bar includes File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, and Help. The title bar indicates "v10.0 *** BETA VERSION (based on v10.073) ***". The toolbar below the menu bar contains icons for selection, zooming, and various data layers like DSS2, SDSS, and 2MASS. On the left, a sidebar lists "Available data" with counts for Collections, Image, Data base, Catalog, Cube, Ancillary, Outreach, Others, and Problems. The right side features a "Last news" section with a list of new HiPS datasets available, such as IPHAS DR2 r and halpha, HIPASS cube, PanSTARRS v band, DECaLS-DR5 g band, and UKIRT Hemisphere Survey. A "select" tool palette is visible on the right, and a "CDS/B/DSS2/color" panel at the bottom right shows controls for epoch, size, density, opacity, and zoom level, currently set to SAO07046°. The bottom navigation bar includes buttons for exp, sort, view, scan, grid, study, work, north, hor, multiview, and match.

HiPS : special data organisation



CDS prototype content : HiPS and progenitors

- HiPS
 - Multiresolution all sky view, hierarchical, based on healpix cells at all orders
 - needs processing of « original images » to be generated
 - It's a VO standard.
- Tools exist to generate and read it
- Progenitors are some time available
- AT CDS : Metainformation on the HiPS has been transferred in a relational database underlying the ProvTAP service



Motivation :Trace the history of HiPS

Every step in the same way (in contrast to HiPS properties spec)

→ Schmidt plates → DSS → DSS color → HiPS

→ MEGACAM → CFHTLS stacks → HiPS



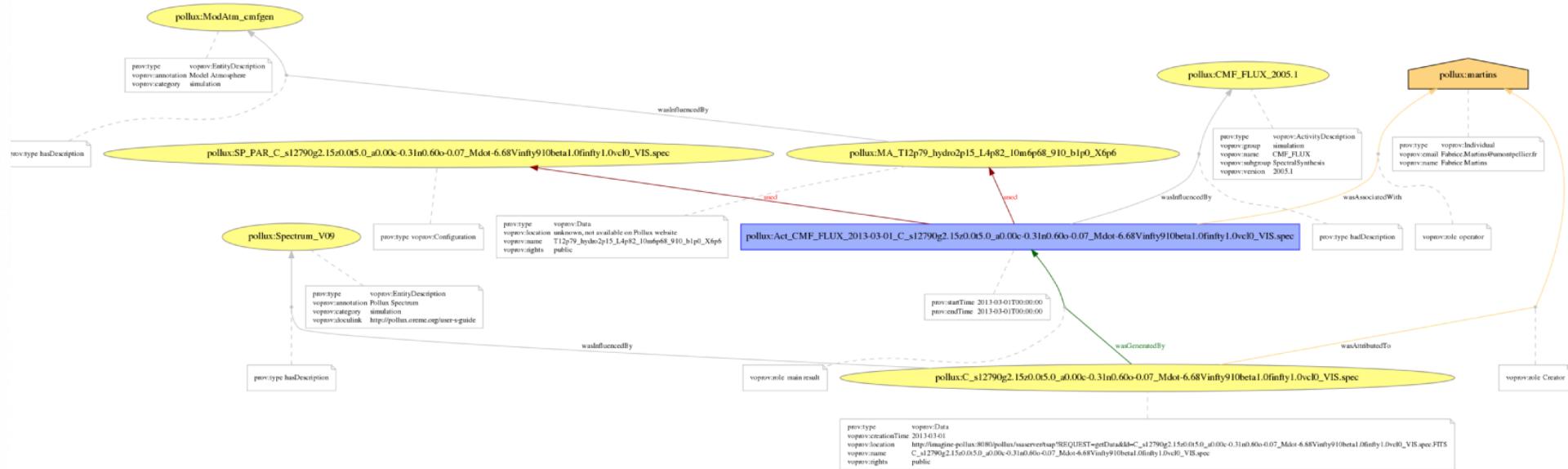
What is ProvTAP for ?

- Distributing provenance metadata for astronomical datasets
- Selecting datasets by provenance
- ProvTAP is a specification for services serializing IVOA provenance metadata model



Serialisation and services : ProvSAP exists

- A parameter based service to get provenance information for a dataset in several formats including graphical format



Parameter	Values	Description
ID	qualified ID	a valid qualified identifier for an entity, activity or agent (can occur multiple times)
DEPTH	0,1,2,..., ALL	number of relations to be followed or ALL for everything, independent of the relation type
RESPONSEFORMAT	PROV-N, PROV-JSON, PROV-XML, PROV-VOTABLE	serialisation format of the response
DIRECTION	BACK, FORTH	BACK = track the provenance history, FORTH = explore the results of activities and where entities have been used if true/1, retrieve and track members of collections
MEMBERS	true (1) or false (0)	if true/1, retrieve and track steps of activityFlows
STEPS	true (1) or false (0)	if true/1, explore all relations for agents, i.e. find out what an agent is responsible for
AGENT	true (1) or false (0)	compatibility of the serialization to IVOA or W3C
MODEL	IVOA or W3C	

ProvTAP specification for datamodel serialisation and metadata service

- 1) ProvTAP isTAP
- 2) mapping of the model classes/attributes to the relational view.
- 3) specification is currently an internal IVOA draft



IVOA Provenance Table Access Protocol (ProvTAP)

Version 1.0

IVOA Working Draft 2018-03-22

Working group

DM

This version

<http://www.ivoa.net/documents/ProvTAP/20180322>

Latest version

<http://www.ivoa.net/documents/ProvTAP>

Previous versions

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Abstract

This document describes the ProvTAP protocol for accessing provenance information according to the IVOA ProvenanceDM standard. It defines how the elements of ProvDM are described in the TAP schema tables and provides guidelines for implementing with TAP 1.1.

TAP

- A specification which defines :
 - Interoperable table services, with relational view
 - Querable via a sql-oriented langage : ADQL
 - Lot of tap services in many datacenters and big projects archives.
- DataModels can be mapped in TAP via the « TAP schema » (the database schema) using object/relational mapping guidelines



ProvTAP

- A TAP schema has been defined
 - All classes and attributes of the model are mapped onto tables and columns of the schema
- A Prototype has been recently developped at CDS
→ screenshots in next slides
- CTA/HESS implementation in development in collaboration with CDS



Some ProvTAP tables : datasetEntity

Name	ucd	utype	datatype
d_id	meta.id	voprov:DatasetEntity.id	char
d_name	meta.title	voprov:DatasetEntity.name	char
d_type	meta.code.class	voprov:DatasetEntity.type	char
d_rights	meta.code.class	voprov:Entity.rights	char
d_comment	meta.description	voprov:DatasetEntity.comment	char
d_location	meta.ref.url	voprov:DatasetEntity.location	char
→ d_hadMember	meta.code.member	voprov:Entity.hadMember	char
→ d_description	meta.id	voprov:Entity.description_id	char
→ d_usedEntity	meta.id	voprov:Entity.wasDerivedFrom.usedEntity	char

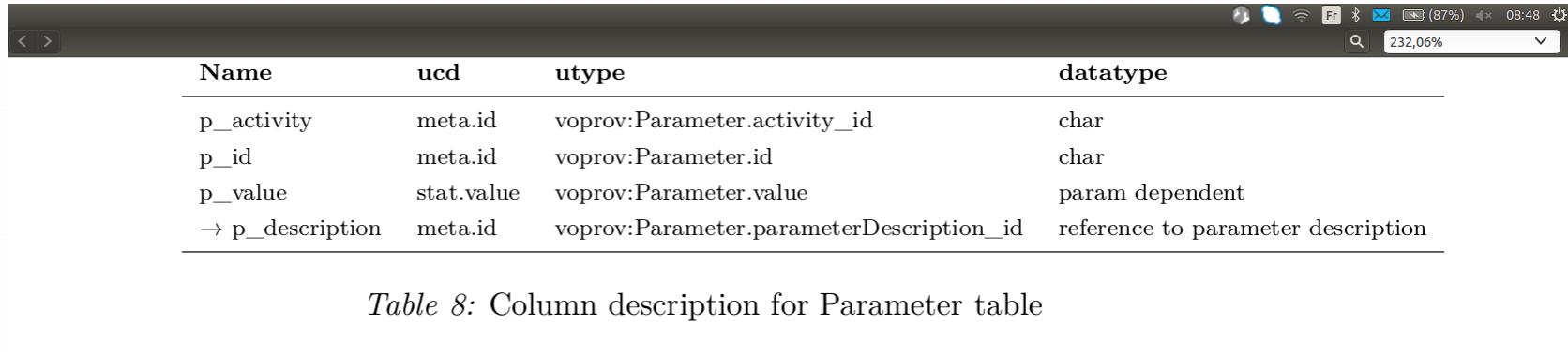
Table 3: Column description for DatasetEntity table

Some ProvTAP tables : parameterDescription

Name	ucd	utype	datatype
pd_activitydescription	meta.id	voprov:ParameterDescription.activityDescription_id	char
pd_id	meta.id	voprov:ParameterDescription.id	char
pd_name	meta.title	voprov:ParameterDescription.name	param dependent
pd_description	meta.description	voprov:ParameterDescription.description	char
pd_datatype	meta	voprov:ParameterDescription.datatype	char
pd_unit	meta.unit	voprov:ParameterDescription.unit	char
pd_ucd	meta.ucd	voprov:ParameterDescription.ucd	char
pd_utype	meta	voprov:ParameterDescription.utype	char
pd_min	stat.min	voprov:ParameterDescription.min	param dependent
pd_max	stat.max	voprov:ParameterDescription.max	param dependent
pd_options	meta	voprov:ParameterDescription.options	param dependent



Some ProvTAP tables : parameter



A screenshot of a Mac OS X desktop environment. At the top, there's a dark menu bar with standard Apple icons and system status indicators. Below it is a window title bar with a magnifying glass icon and the number '232,06%'. The main content area contains a table with four columns: 'Name', 'ucd', 'utype', and 'datatype'. The table rows are as follows:

Name	ucd	utype	datatype
p_activity	meta.id	voprov:Parameter.activity_id	char
p_id	meta.id	voprov:Parameter.id	char
p_value	stat.value	voprov:Parameter.value	param dependent
→ p_description	meta.id	voprov:Parameter.parameterDescription_id	reference to parameter description

Table 8: Column description for Parameter table

ProvHiPS database excerpt as an example

```
GAPS_sample_kp7.dat x prov_example_hipsv2.txt x

voprov = "http://www.ivoa.net/documents/ProvenanceDM#"

## Description classes

ad_id hipsgen1 :: ActivityDescription
ad_name ActivityDescription.name = "Aladin/HipsGen v9.615"
ad_version ActivityDescription.version = "1"
ad_description ActivityDescription.description = "Genaration of HipS using CDS hipsgen version 9.615"
ad_ActivityDescription.doculink = "http://aladin.u-strasbg.fr/hips/#doc"
ad_ActivityDescription.type = "hipsgen"
ad_ActivityDescription.subtype = "hipsgen_mean"

dd_id hipsdata :: DatasetDescription
dd_name DatasetDescription.name = "Hierachical progressive Image Survey"
dd_description DatasetDescription.description = "Hierachical progressive Image Survey"
dd_content DatasetDescription.contentType = "application/hips"
dd_doculink DatasetDescription.doculink = "http://aladin.u-strasbg.fr/doculink.html"
dd_type DatasetDescription.type = "Data"
dd_subtype DatasetDescription.subtype = "HipsDataSet"

dd_id origimages :: DatasetDescription
dd_name DatasetDescription.name = "Original Images "
dd_description DatasetDescription.description = "Original Images "
dd_content DatasetDescription.contentType = "image/fits"
dd_type DatasetDescription.type = "Data"
dd_subtype DatasetDescription.subtype = "ImageCollection"

ud_id hipsgen0origimages :: UsageDescription
ud_role UsageDescription.role = "HipSprogenitors"
ud_description UsageDescription.description = "HipS progenitors"
ud_type UsageDescription.type = "Main"
ud_multiplicity UsageDescription.multiplicity = "*"
ud_activity UsageDescription.activityDescription_id = "hipsgen0"
ud_entity UsageDescription.entityDescription_id = "origimages"
```

Goals of ProvHiPS prototype

- Create a first ProvTAP implementation
- Integrate information on HiPS as well as classical images in the same design
- Full integration of HiPS provenance searches in the general VO framework



Simple queries to browse the content

- Entities
- Activities
- Agents
- Select parameters with associated ParameterDescriptions and activities to which they are related
- Caution : the queries displayed there are consistent with the october PR → to be upgraded.



first query in the html interface provided with the TAP library (G.Mantelet) : select * from entity

TAP HOME PAGE

- CDS -

Available resources

- [tables](#)
- [sync](#)
- [capabilities](#)
- [async](#)
- [availability](#)

ADQL query

Query:

```
SELECT *\nFROM entity;
```



Execution mode: Asynchronous/Batch Synchronous

Format: votable/td ▾

Result limit: -1 rows (0 to get only metadata ; a value < 0 means 'default value')

Duration limit: -1 seconds (a value ≤ 0 means 'default value')

Execute!

VOTable response

```
<VOTABLE version="1.3" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.3 http://www.ivoa.net/xml/VOTable/v1.3">
- <RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK"/>
  <INFO name="PROVIDER" value="CDS"/>
  <INFO name="QUERY" value="SELECT * FROM entity;"/>
- <TABLE name="result_S1542030444145">
  <FIELD arraysize="**" datatype="char" name="e_id" ucd="meta.id" utype="voprov:Entity.id"/>
  <FIELD arraysize="**" datatype="char" name="e_name" ucd="meta.title" utype="voprov:Entity.name"/>
  <FIELD arraysize="**" datatype="char" name="e_type" ucd="meta.code.class" utype="voprov:Entity.type"/>
  <FIELD arraysize="**" datatype="char" name="e_rights" ucd="meta.code.class" utype="voprov:Entity.rights"/>
  <FIELD arraysize="**" datatype="char" name="annotation" ucd="meta.description" utype="voprov:Entity.annotation"/>
  <FIELD arraysize="**" datatype="char" name="e_description" ucd="meta.id" utype="voprov:Entity.description"/>
- <DATA>
  - <TABLEDATA>
    - <TR>
      <TD>ivo://CDS/P/2MASS/H</TD>
      <TD>2MASS H (1.66um) HiPS</TD>
      <TD>data</TD>
      <TD>public</TD>
      <TD/>
      <TD>hipsdata</TD>
    </TR>
    - <TR>
      <TD>origima0</TD>
      <TD>2MASS H (1.66um) original data</TD>
      <TD>data</TD>
      <TD>public</TD>
      <TD>2MASS H (1.66um) original data</TD>
      <TD>origimages</TD>
    </TR>
    - <TR>
      <TD>ivo://CDS/P/2MASS/J</TD>
      <TD>2MASS J (1.23um) HiPS</TD>
      <TD>data</TD>
      <TD>public</TD>
      <TD>
        2MASS has uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with signal-to-noise ratio (SNR) greater than 10, using a pixel size of 2.0''. This has achieved an 80,000-fold improvement in sensitivity relative to earlier surveys. 2MASS used two highly-automated 1.3-m telescopes, one at Mt. Hopkins, AZ, and one at CTIO, Chile. Each telescope was equipped with a three-channel camera, each channel consisting of a 256x256 array of HgCdTe detectors, capable of observing the sky simultaneously at J (1.25 microns), H (1.65 microns), and Ks (2.17 microns). The University of Massachusetts (UMass) was responsible for the overall management of the project, and for developing the infrared cameras and on-site computing systems at both facilities. The Infrared Processing and Analysis Center (IPAC) is responsible for all data processing through the Production Pipeline, and construction and distribution of the data products. Funding is provided primarily by NASA and the NSF
      </TD>
      <TD>hipsdata</TD>
    </TR>
    - <TR>
      <TD>origima1</TD>
      <TD>2MASS J (1.23um) original data</TD>
      <TD>data</TD>
      <TD>public</TD>
      <TD>2MASS J (1.23um) original data</TD>
      <TD>origimages</TD>
    </TR>
```

```
datatype: "char"
arraysize: "*"
ucd: "meta.description"
utype: "voprov:Activity.annotation"

▼ 5:
  name: "a_description"
  datatype: "char"
  arraysize: "*"
  ucd: "meta.id"
  utype: "voprov:Activity.description"

▼ data:
  ▼ 0:
    0: "act:CDS/P/2MASS/H"
    1: "Generation of 2MASS H (1.66um) HiPS"
    2: null
    3: null
    4: "Generation of 2MASS H (1.66um) HiPS"
    5: "hipsgen0"

  ▼ 1:
    0: "act:CDS/P/2MASS/J"
    1: "Generation of 2MASS J (1.23um) HiPS"
    2: "2013-05-06T20:36Z"
    3: "2013-05-06T20:36Z"
    4: "Generation of 2MASS J (1.23um) HiPS"
    5: "hipsgen0"

  ▼ 2:
    0: "act:CDS/P/2MASS/K"
    1: "Generation of 2MASS K (2.16um) HiPS"
    2: "2014-02-11T11:28Z"
    3: "2014-02-11T11:28Z"
    4: "Generation of 2MASS K (2.16um) HiPS"
    5: "hipsgen0"

  ▼ 3:
    0: "act:CDS/P/2MASS/color"
    1: "Generation of 2MASS color J (1.23um), H (1.66um), K (2.16um) HiPS"
    2: "2013-01-14T09:45Z"
    3: "2013-01-14T09:45Z"
    4: "Generation of 2MASS color J (1.23um), H (1.66um), K (2.16um) HiPS"
    5: "hipsgen0"

  ▼ 4:
    0: "act:CDS/P/2MASS6X/H"
    1: "Generation of 2MASS6X H (1.66um) HiPS"
    2: "2012-02-24T12:43Z"
    3: "2012-02-24T12:43Z"
    4: "Generation of 2MASS6X H (1.66um) HiPS"
    5: "hipsgen1"

  ▼ 5:
```



SELECT * FROM ACTIVITY

JSON Response



Agents – text format

ag_id	ag_name	ag_type
"noagent"	"noname"	"notype"
"agent_1_277"	"1.0"	"Organisation"
"agent_1_328"	"Pierre Fernique [CDS]"	"Organisation"
"agent_1_537"	"L. Michel [Observatoire de Strasbourg]"	"Organisation"
"agent_1_222"	"P. fernique [CDS]"	"Organisation"
"agent_1_190"	"P.Fernique (CDS)"	"Organisation"
"agent_1_378"	"ESA (ESDC & Planck Science Office)"	"Organisation"
"agent_1_5"	"CDS (T.Boch)"	"Organisation"
"agent_1_318"	"Stefan Meingast (Institute for Astrophysics, University of Vienna)"	"Organisation"
"agent_1_371"	"ESA/ESDC"	"Organisation"
"agent_1_191"	"CDS (Pierre Fernique)"	"Organisation"
"agent_1_432"	"D. Paradis (IRAP/CADE)"	"Organisation"
"agent_1_330"	"Thomas Boch [CDS]"	"Organisation"
"agent_1_33"	"CDS (Thomas Boch)"	"Organisation"
"agent_1_407"	"Guilherme Soares"	"Organisation"
"agent_1_36"	"Thomas Boch"	"Organisation"
"agent_1_99"	"CDS (A.Oberto, P.Fernique)"	"Organisation"
"agent_1_97"	"CDS (P.Fernique)"	"Organisation"
"agent_1_8"	"CDS [P.Fernique]"	"Organisation"
"agent_1_44"	"T. Boch"	"Organisation"
"agent_1_7"	"CDS"	"Organisation"
"agent_1_352"	"ESA (ESDC & Herschel SOC)"	"Organisation"
"agent_1_342"	"China-VO"	"Organisation"
"agent_1_130"	"CADC (Daniel Durand)"	"Organisation"
"agent_1_409"	"NASA/HEASARC"	"Organisation"
"agent_1_9"	"P. Fernique [CDS]"	"Organisation"
"agent_1_14"	"M.Buga [CDS]"	"Organisation"
"agent_1_354"	"ESA (ESDC & Herschel Science Centre)"	"Organisation"
"agent_1_16"	"P.Fernique [CDS]"	"Organisation"
"agent_1_536"	"WFAU, Institute for Astronomy, University of Edinburgh"	"Organisation"
"agent_1_126"	"Christoph Deil, Axel Donath, Pierre Fernique"	"Organisation"
"agent_1_1"	"CDS (A.Oberto)"	"Organisation"
"agent_2_225"	"Axel Mellinger"	"Organisation"
"agent_2_227"	"JPL/Photojournal"	"Organisation"
"agent_2_535"	"SVO, CAB (INTA-CSIC)"	"Organisation"
"agent_2_221"	"Qrizona State University"	"Organisation"
"agent_2_350"	"http://archives.esac.esa.int/hsa/whsa/"	"Organisation"
"agent_2_36"	"http://portal.nersc.gov/project/cosmo/data/decaps/dr1/coadd/"	"Organisation"
"agent_2_232"	"USGS Astrogeology Science Center from Arizona State University"	"Organisation"
"agent_2_170"	"MAST archives"	"Organisation"
"agent_2_114"	"NASA s Earth Observatory"	"Organisation"
"agent_2_34"	"http://portal.nersc.gov/project/cosmo/data/legacysurvey/dr5/coadd/"	"Organisation"
"agent_2_216"	"https://photojournal.jpl.nasa.gov/catalog/PIA20284"	"Organisation"
"agent_2_377"	"http://iso.esac.esa.int/ida/"	"Organisation"
"agent_2_17"	"CFHT"	"Organisation"

```

SELECT p_isaparamof,pd_name, pd_ucd, pd_unit, p_value
FROM parameter INNER JOIN parameterdescription
ON parameter.p_parameterdescription = parameterdescription.pd_id;

```

p_isaparamof	pd_name	pd_ucd	pd_unit	p_value
"act:CDS/P/2MASS/H"	"hips_order"			"9"
"act:CDS/P/2MASS/H"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS/H"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS/H"
"act:CDS/P/2MASS/H"	"obs_title"	"meta.title"		"2MASS H (1.66um)"
"act:CDS/P/2MASS/H"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS/H"	"hips_tile_format"	"meta.format"		"jpeg fits"
"act:CDS/P/2MASS/J"	"hips_order"			"9"
"act:CDS/P/2MASS/J"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS/J"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS/J"
"act:CDS/P/2MASS/J"	"obs_title"	"meta.title"		"2MASS J (1.23um)"
"act:CDS/P/2MASS/J"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS/J"	"hips_tile_format"	"meta.format"		"jpeg fits"
"act:CDS/P/2MASS/K"	"hips_order"			"9"
"act:CDS/P/2MASS/K"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS/K"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS/K"
"act:CDS/P/2MASS/K"	"obs_title"	"meta.title"		"2MASS K (2.16um)"
"act:CDS/P/2MASS/K"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS/K"	"hips_tile_format"	"meta.format"		"jpeg fits"
"act:CDS/P/2MASS/color"	"hips_order"			"9"
"act:CDS/P/2MASS/color"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS/color"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS/color"
"act:CDS/P/2MASS/color"	"obs_title"	"meta.title"		"2MASS color J (1.23um), H (1.66um), K (2.16um)"
"act:CDS/P/2MASS/color"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS/color"	"hips_tile_format"	"meta.format"		"jpeg"
"act:CDS/P/2MASS6X/H"	"hips_order"			"9"
"act:CDS/P/2MASS6X/H"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS6X/H"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS6X/H"
"act:CDS/P/2MASS6X/H"	"obs_title"	"meta.title"		"2MASS6X H (1.66um)"
"act:CDS/P/2MASS6X/H"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS6X/H"	"hips_tile_format"	"meta.format"		"png jpeg fits"
"act:CDS/P/2MASS6X/J"	"hips_order"			"9"
"act:CDS/P/2MASS6X/J"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS6X/J"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS6X/J"
"act:CDS/P/2MASS6X/J"	"obs_title"	"meta.title"		"2MASS6X J (1.23um)"
"act:CDS/P/2MASS6X/J"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS6X/J"	"hips_tile_format"	"meta.format"		"jpeg fits"
"act:CDS/P/2MASS6X/K"	"hips_order"			"9"
"act:CDS/P/2MASS6X/K"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS6X/K"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS6X/K"
"act:CDS/P/2MASS6X/K"	"obs_title"	"meta.title"		"2MASS6X K (2.16um)"
"act:CDS/P/2MASS6X/K"	"hips_tile_width"		"px"	"512"
"act:CDS/P/2MASS6X/K"	"hips_tile_format"	"meta.format"		"jpeg fits"
"act:CDS/P/2MASS6X/color"	"hips_order"			"9"
"act:CDS/P/2MASS6X/color"	"hips_frame"			"equatorial"
"act:CDS/P/2MASS6X/color"	"hips_frame"	"meta.id"		"ivo://CDS/P/2MASS6X/color"
"act:CDS/P/2MASS6X/color"	"obs_title"	"meta.title"		"2MASS6X color J (1.23um) & K (2.16um)"

Configuration parameters with their description (name, ucd,unit And associated activity)

Real-life queries :

To select HiPS activities or entities via criteria

- Select activities which have been attributed to a given « Agent »
- Select activities described by the same ActivityDescription (= here, running the same software)
- Select activities from some configuration parameters values
- Select entities and display them in Aladin (HiPS or classical images)



Select activities which have been attributed to a given « Agent » (here « CADC (Daniel Durand) »)

TOPCAT(5): Table Browser

Window Subsets Help

Table Browser for 5: TAP_8 (SELECT,WasAssociatedWith,agent,Activity)

	a_id	a_name	a_annotation
1	act:CDS/P/HLA/C0	Generation of HLA-C0 : F222M HIPS	Generation of HLA-C0 : F222M HIPS
2	act:CDS/P/HLA/H	Generation of HLA-H : F160W HIPS	Generation of HLA-H : F160W HIPS
3	act:CDS/P/HLA/H20	Generation of HLA-H20 : F139M HIPS	Generation of HLA-H20 : F139M HIPS
4	act:CDS/P/HLA/HalpHa	Generation of HLA-HalpHa : F656N and F657N ...	Generation of HLA-HalpHa : F656N and F657N ...
5	act:CDS/P/HLA/beta	Generation of HLA-Hbeta : F487N and F486N ...	Generation of HLA-Hbeta : F487N and F486N ...
6	act:CDS/P/HLA/I	Generation of HLA-I : F814W, F791W, F785LP a...	Generation of HLA-I : F814W, F791W, F785LP a...
7	act:CDS/P/HLA/J	Generation of HLA-J : F140W, F125W, F125LP a...	Generation of HLA-J : F140W, F125W, F125LP a...
8	act:CDS/P/HLA/NII	Generation of HLA-NII : F658N HIPS	Generation of HLA-NII : F658N HIPS
9	act:CDS/P/HLA/OII	Generation of HLA-OII : F375N and F373N HIPS	Generation of HLA-OII : F375N and F373N HIPS
10	act:CDS/P/HLA/OIII	Generation of HLA-OIII : F502N HIPS	Generation of HLA-OIII : F502N HIPS
11	act:CDS/P/HLA/PalpHa	Generation of HLA-PalpHa : F187N HIPS	Generation of HLA-PalpHa : F187N HIPS
12	act:CDS/P/HLA/PalpHa_c	Generation of HLA-PalpHa_c : F190W HIPS	Generation of HLA-PalpHa_c : F190W HIPS
13	act:CDS/P/HLA/R	Generation of HLA-R : F702W and F675W HIPS	Generation of HLA-R : F702W and F675W HIPS
14	act:CDS/P/HLA/SDSSg	Generation of HLA-SDSSg : F475W HIPS	Generation of HLA-SDSSg : F475W HIPS
15	act:CDS/P/HLA/SDSSr	Generation of HLA-SDSSr : F625W and F622W ...	Generation of HLA-SDSSr : F625W and F622W ...
16	act:CDS/P/HLA/SDSSz	Generation of HLA-SDSSz : F850LP HIPS	Generation of HLA-SDSSz : F850LP HIPS
17	act:CDS/P/HLA/SIII	Generation of HLA-SIII : F873N, F0672N and F...	Generation of HLA-SIII : F873N, F0672N and F...
18	act:CDS/P/HLA/U	Generation of HLA-U : F336W, F330W, F300W, ...	Generation of HLA-U : F336W, F330W, F300W, ...
19	act:CDS/P/HLA/UV	Generation of HLA-UV : F170W HIPS	Generation of HLA-UV : F170W HIPS
20	act:CDS/P/HLA/V	Generation of HLA-V : F555W, F547W, F569W ...	Generation of HLA-V : F555W, F547W, F569W ...
21	act:CDS/P/HLA/Y	Generation of HLA-Y : F110W and F105W HIPS	Generation of HLA-Y : F110W and F105W HIPS
22	act:CDS/P/HLA/wideUV	Generation of HLA-wideUV : F255W, F250W, F2...	Generation of HLA-wideUV : F255W, F250W, F2...
23	act:CDS/P/HLA/wideV	Generation of HLA-wideV : F606W and F600LP ...	Generation of HLA-wideV : F606W and F600LP ...
24	act:CDS/P/HST/B	Generation of HST-B includes the following fil...	Generation of HST-B includes the following fil...
25	act:CDS/P/HST/C0	Generation of HST-C0 includes the following fil...	Generation of HST-C0 includes the following fil...
26	act:CDS/P/HST/GOODS/b	Generation of GOODS b HIPS	Generation of GOODS b HIPS
27	act:CDS/P/HST/H20	Generation of HST-H20 includes the following ...	Generation of HST-H20 includes the following ...
28	act:CDS/P/HST/HalpHa	Generation of HST-HalpHa includes the followi...	Generation of HST-HalpHa includes the followi...
29	act:CDS/P/HST/beta	Generation of HST-beta includes the followin...	Generation of HST-beta includes the followin...
30	act:CDS/P/HST/I	Generation of HST-I includes the following fil...	Generation of HST-I includes the following fil...
31	act:CDS/P/HST/J	Generation of HST-J includes the following fil...	Generation of HST-J includes the following fil...
32	act:CDS/P/HST/NII	Generation of HST-NII includes the following fil...	Generation of HST-NII includes the following fil...
33	act:CDS/P/HST/OII	Generation of HST-OII includes the following fil...	Generation of HST-OII includes the following fil...
34	act:CDS/P/HST/OIII	Generation of HST-OIII includes the following fil...	Generation of HST-OIII includes the following fil...
35	act:CDS/P/HST/PHAT/F110W	Generation of HST PHAT - F110W - WFC3/IR HIPS	Generation of HST PHAT - F110W - WFC3/IR HIPS
36	act:CDS/P/HST/PalpHa_c	Generation of HST-PalpHa_c includes the follo...	Generation of HST-PalpHa_c includes the follo...
37	act:CDS/P/HST/R	Generation of HST-R includes the following fil...	Generation of HST-R includes the following fil...
38	act:CDS/P/HST/SDSSg	Generation of HST-SDSSg includes the followin...	Generation of HST-SDSSg includes the followin...
39	act:CDS/P/HST/SDSSr	Generation of HST-SDSSr includes the followin...	Generation of HST-SDSSr includes the followin...
40	act:CDS/P/HST/SDSSz	Generation of HST-SDSSz includes the followin...	Generation of HST-SDSSz includes the followin...
41	act:CDS/P/HST/SIII	Generation of HST-SIII includes the following fil...	Generation of HST-SIII includes the following fil...
42	act:CDS/P/HST/U	Generation of HST-U includes the following fil...	Generation of HST-U includes the following fil...
43	act:CDS/P/HST/UV	Generation of HST-UV includes the following fil...	Generation of HST-UV includes the following fil...
44	act:CDS/P/HST/V	Generation of HST-V includes the following fil...	Generation of HST-V includes the following fil...
45	act:CDS/P/HST/Y	Generation of HST-Y includes the following fil...	Generation of HST-Y includes the following fil...
46	act:CDS/P/HST/other	Generation of HST-Others HIPS	Generation of HST-Others HIPS
47	act:CDS/P/HST/wideUV	Generation of HST-wideUV includes the followi...	Generation of HST-wideUV includes the followi...
48	act:CDS/P/HST/wideV	Generation of HST-wideV includes the followi...	Generation of HST-wideV includes the followi...
49	act:CDS/P/Haslam408	Generation of Haslam 408MHz HIPS	Generation of Haslam 408MHz HIPS

Table Access Protocol (TAP) Query

Window TAP Registry Edit Interop Help

Select Service Use Service Resume Job Running Jobs

Metadata Find: Name Descrip Or

O Service O Schema O Table O Columns O FKeys Hints

Name: Tables: Description:

TAP Service (19) TAP_SCHEMA (5) TAP_SCHEMA.col TAP_SCHEMA.key TAP_SCHEMA.sch TAP_SCHEMA.tab provenance (14) activity activitydescription agent entity entitydescription miniblobscore parameter parameterdescription used useddescription

Service Capabilities Query Language: ADQL-2.0 Max Rows: 1000000 (default) Uploads: unavailable

ADQL Text Mode: Synchronous

```

SELECT Activity.a_id, Activity.a_name, Activity.a_annotation FROM
  (SELECT WasAssociatedWith.wav_activity_id FROM WasAssociatedWith
    INNER JOIN agent
      ON agent.ag_id = WasAssociatedWith.wav_agent_id
      WHERE agent.ag_name = 'CADC (Daniel Durand)') AS temp1
    INNER JOIN Activity
      ON temp1.wav_activity_id = Activity.a_id
  
```

Examples Run Query Info

select activities described by the same ActivityDescription (= here, running the same hipsgen software)

The diagram illustrates the workflow for selecting activities described by the same ActivityDescription, showing the interaction between three software components:

- TOPCAT**: A desktop application for managing datasets and performing astronomical queries. It displays a "Current Table Properties" panel for a table named "TAP_12_activitydescription.activity".
- TAP Access Protocol (TAP) Query**: A web-based query interface. It shows a "Service Capabilities" section with an ADQL query:

```
SELECT a_name,a_starttime,ad_name,ad_doculink
      FROM activitydescription INNER JOIN activity ON a_description = ad_id
      WHERE ad_name = 'Aladin/HipsGen v10.060'
```
- Aladin/HipsGen web interface**: A browser-based interface for the HiPS survey. It shows a table titled "Table Browser for 8: TAP_12_activitydescription.activity" with two rows of data:

a_name	a_starttime	ad_name	ad_doculink
1 Generation of DECaPS DR1 g HiPS	2018-01-02T16:02Z	Aladin/HipsGen v10.060	http://aladin.u-strasbg.fr/hips/#doc
2 Generation of ROSAT X-Ray All-Sky Survey HiPS	2018-02-03T16:36Z	Aladin/HipsGen v10.060	http://aladin.u-strasbg.fr/hips/#doc

A red arrow points from the "ad_name" column in the table browser to the "ad_name" parameter in the TAP query, indicating that the query is filtering results based on the HiPS version.

Display
Software documentation

Select activities from some configuration parameters values (here « created only in jpeg »)

TOPCAT(12): Table Browser

Window Subsets Help

Table Browser for 12: TAP_17 (select,parameter,parameterdescription,ac...

	a_name	a_starttime	pd_name	p_value
1	Generation of 2MASS color J (1.23um), H (1.66...	2013-01-14T09:45Z	hips_tile_format	jpeg
2	Generation of Ariel Voyager HiPS	2017-02-20T16:03Z	hips_tile_format	jpeg
3	Generation of CFHTLS-D-color-ugi HiPS		hips_tile_format	jpeg
4	Generation of CFHTLS-W-colored-ugi HiPS	2012-06-07T22:09Z	hips_tile_format	jpeg
5	Generation of Callisto Voyager-Galileo-simp-1k...	2014-03-11T15:59Z	hips_tile_format	jpeg
6	Generation of Charon New-Horizon PIA19866 H...	2018-01-17T16:49Z	hips_tile_format	jpeg
7	Generation of DECaLS DR3 color HiPS		hips_tile_format	jpeg
8	Generation of DECaLS DR5 color HiPS		hips_tile_format	jpeg
9	Generation of Color flux map for I/345/gaia2 (...	2018-04-17T08:17Z	hips_tile_format	jpeg
10	Generation of DSS colored HiPS	2015-02-07T11:42Z	hips_tile_format	jpeg
11	Generation of Dione Cassini PIA12577 HiPS	2012-07-13T14:03Z	hips_tile_format	jpeg
12	Generation of Blue Marble Next Generation w/...	2014-06-05T17:00Z	hips_tile_format	jpeg
13	Generation of Enceladus Cassini 110m (PIA 1...		hips_tile_format	jpeg
14	Generation of Europa Voyager-GalileoSSI-500...		hips_tile_format	jpeg
15	Generation of Fermi Color HEALPix survey HiPS	2013-06-28T09:09Z	hips_tile_format	jpeg
16	Generation of Ganymede VoyagerGalileo SSI 1...	2014-06-13T14:41Z	hips_tile_format	jpeg
17	Generation of IRAS-IRIS HEALPix survey, color ...		hips_tile_format	jpeg
18	Generation of Iapetus Cassini PIA18436 HiPS		hips_tile_format	jpeg
19	Generation of JPS-PR1 850um HiPS		hips_tile_format	jpeg
20	Generation of MAMA srcj HiPS	2016-07-09T19:09Z	hips_tile_format	jpeg
21	Generation of Mars MGS MOLA Elevation Mode...		hips_tile_format	jpeg
22	Generation of Mars MGS TES Dust HiPS		hips_tile_format	jpeg
23	Generation of Mars MOLA Shaded Relief / Colo...	2018-01-27T17:35Z	hips_tile_format	jpeg
24	Generation of Mars Stimson panorama HiPS		hips_tile_format	jpeg
25	Generation of Mars TES Albedo HiPS		hips_tile_format	jpeg
26	Generation of Mars TES Thermal Inertia HiPS		hips_tile_format	jpeg
27	Generation of Mars THEMIS-Day-100m HiPS		hips_tile_format	jpeg
28	Generation of Mars THEMIS-Night-100m HiPS	2018-01-24T15:41Z	hips_tile_format	jpeg
29	Generation of Mars THEMIS Day IR Global Mos...	2018-01-28T10:29Z	hips_tile_format	jpeg
30	Generation of Mars mola-roughness HiPS	2017-06-01T16:14Z	hips_tile_format	jpeg
31	Generation of Mellingen color optical survey Hi...	2017-09-07T13:10Z	hips_tile_format	jpeg
32	Generation of Mercury MESSENGER-MD15-LO1-1...	2018-01-27T17:16Z	hips_tile_format	jpeg
33	Generation of Mimas Cassini PIA17214 HiPS	2010-07-12T00:00Z	hips_tile_format	jpeg
34	Generation of Miranda Voyager HiPS	2018-01-21T16:06Z	hips_tile_format	jpeg
35	Generation of Moon Kaguya-Evening-V04-474...		hips_tile_format	jpeg
36	Generation of Moon Lunar Reconnaissance Or...	2018-01-17T15:01Z	hips_tile_format	jpeg
37	Generation of NVSS - The NRAO VLA Sky Survey...	2018-01-29T12:31Z	hips_tile_format	jpeg
38	Generation of Neptune Voyager2 HiPS	2018-02-08T13:07Z	hips_tile_format	jpeg
39	Generation of PLANCK Maps of the CMB fluctu...		hips_tile_format	jpeg
40	Generation of PLANCK R2 nominal frequency H...		hips_tile_format	jpeg
41	Generation of PLANCK R2 nominal frequency L...		hips_tile_format	jpeg
42	Generation of PanSTARRS DR1 z HiPS	2017-05-04T13:27Z	hips_tile_format	jpeg
43	Generation of ROSAT Wide Field Camera Color ...	2016-02-09T15:40Z	hips_tile_format	jpeg
44	Generation of SCUBA2 850um HiPS		hips_tile_format	jpeg
45	Generation of MIPS3 survey in Healpix HiPS	2011-07-04T15:11Z	hips_tile_format	jpeg
46	Generation of SUMSS (843 MHz) HiPS	2012-05-31T14:50Z	hips_tile_format	jpeg
47	Generation of Sun euvi-ala304-2012 HiPS		hips_tile_format	jpeg
48	Generation of Tethys Cassini-PIA18439 HiPS		hips_tile_format	jpeg
49	Generation of Titan ISS-PI19658-4km HiPS	2018-01-23T14:15Z	hips_tile_format	jpeg
50	Generation of Titan SAR-HISAR-128ppd HiPS		hips_tile_format	jpeg
51	Generation of Triton Voyager HiPS	2018-01-17T17:00Z	hips_tile_format	jpeg

Table Access Protocol (TAP) Query

Window TAP Registry Edit Interop Help

Select Service Use Service Resume Job Running jobs

Metadata

Find: Name Descrip Or

Name	DataType	Indexed	Unit	Description	UCD	Utype
pd_isaparamof	VARCHAR				meta.id	voprov:ParameterDescription.ActivityDesc
pd_id	VARCHAR				meta.id	voprov:ParameterDescription.id
pd_name	VARCHAR				meta.title	voprov:ParameterDescription.name
pd_unit	VARCHAR				meta.unit	voprov:ParameterDescription.unit
pd_ucd	VARCHAR				meta.ucd	voprov:ParameterDescription.ucd

Service Capabilities

Query Language: ADQL-2.0 Max Rows: 1000000 (default) Uploads: unavailable

ADQL Text

Mode: Synchronous

```

1
SELECT a_name, a_starttime, templ.pd_name, templ.p_value FROM
  (SELECT p_isaparamof, pd_name, p_value
   FROM parameter INNER JOIN parameterdescription
   ON p_parameterdescription = pd_id
   WHERE pd_name = 'hips_tile_format' and p_value = 'jpeg') AS templ
INNER JOIN
  activity
ON templ.p_isaparamof = a_id

```

Examples Run Query Info

select activities from some configuration parameters values

(here selected by ucd and « created in galactic frame)

TOPCAT(15): Table Browser

Window Subsets Help

Table Browser for 15: TAP_23 (SELECT,parameter,parameterdescription,ac...

a_id	a_name	a_starttime	pd_name	pd_ucd	p_value	
1	act:CDS/P/CO	Generation of CO composite survey HiPS	2012-05-29T21:35Z	hips.frame	pos.frame	galactic
2	act:CDS/P/Finkbeiner	Generation of Finkbeiner Halpha composite s...	2013-06-28T11:09Z	hips.frame	pos.frame	galactic
3	act:CDS/P/HI	Generation of HI composite survey HiPS		hips.frame	pos.frame	galactic
4	act:CDS/P/HI4PI/NHI	Generation of HI4PI NHI survey (full-sky HI col...	2011-02-14T12:00Z	hips.frame	pos.frame	galactic
5	act:CDS/P/Haslam408	Generation of Haslam 408MHz HiPS	2017-06-08T23:47Z	hips.frame	pos.frame	galactic
6	act:CDS/P/Haslam408/v2	Generation of Haslam 408MHz reprocessed Hi...	2015-04-10T13:58Z	hips.frame	pos.frame	galactic
7	act:CDS/P/IIRIS/color	Generation of IRAS-IRIS HEALPix survey, color ...		hips.frame	pos.frame	galactic
8	act:CDS/P/Mellinger/color	Generation of Mercury MESSENGER-MDIS-LOI-1...	2018-01-27T17:16Z	hips.frame	pos.frame	galactic
9	act:CDS/P/PLANCKR2/CMB	Generation of PLANCK R2 HF1 color compositio...		hips.frame	pos.frame	galactic
10	act:CDS/P/PLANCKR2/HF1/color	Generation of PLANCK R2 nominal frequency H...		hips.frame	pos.frame	galactic
11	act:CDS/P/PLANCKR2/HF1100	Generation of PLANCK R2 nominal frequency H...		hips.frame	pos.frame	galactic
12	act:CDS/P/PLANCKR2/HF1143	Generation of PLANCK R2 nominal frequency H...		hips.frame	pos.frame	galactic
13	act:CDS/P/PLANCKR2/HF1217	Generation of PLANCK R2 nominal frequency H...		hips.frame	pos.frame	galactic
14	act:CDS/P/PLANCKR2/HF1353	Generation of PLANCK R2 nominal frequency H...		hips.frame	pos.frame	galactic
15	act:CDS/P/PLANCKR2/HF1545	Generation of PLANCK R2 nominal frequency H...		hips.frame	pos.frame	galactic
16	act:CDS/P/PLANCKR2/HF1857	Generation of PLANCK R2 LFI color compositio...		hips.frame	pos.frame	galactic
17	act:CDS/P/PLANCKR2/LFI/color	Generation of PLANCK R2 nominal frequency L...		hips.frame	pos.frame	galactic
18	act:CDS/P/PLANCKR2/LFI030	Generation of PLANCK R2 nominal frequency L...		hips.frame	pos.frame	galactic
19	act:CDS/P/PLANCKR2/LFI044	Generation of PLANCK R2 nominal frequency L...		hips.frame	pos.frame	galactic

TAP_SCHEMA.col

a_starttime	VARCHAR	time.start	voprov:Activity,startTime
a_endtime	VARCHAR	time.end	voprov:Activity,endTime
a_annotation	VARCHAR	meta.description	voprov:Activity.annotation
a_description	VARCHAR	meta.id	voprov:Activity,description

Service Capabilities

Query Language: ADQL-2.0 Max Rows: 1000000 (default) Uploads: unavailable

ADQL Text

Mode: Synchronous

```

1
SELECT a_id, a_name, a_starttime, pd_name, pd_ucd, p_value
FROM
  (SELECT p_isaparamof, pd_name, pd_ucd, p_value
   FROM parameter INNER JOIN parameterdescription
   ON p_parameterdescription = pd_id
   WHERE pd_ucd = 'pos.frame' and p_value = 'galactic')
  AS temp1
INNER JOIN
  activity
ON activity.a_id = temp1.p_isaparamof

```

Examples Info

Select entities and display them in Aladin (HiPS or classical images) (here « public » entities)

Aladin v10.0 *** BETA VERSION (based on v10.098) ***

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Available data → 2 Command Frame ICRS Projection Aitoff

<http://alasky.u-strasbg.fr/2MASS/K>

Collections → 2228
 -> Image → 396
 -> Data base → 5
 -> Catalog → 20485
 -> Cube → 10
 -> Solar system → 47
 -> Ancillary → 66
 -> Outreach → 44
 -> Others → 1232
 -> Problematic → 3

15.83° x 4.609°

Welcome to Aladin, your professional sky atlas.
 • Discover all astronomical data available over the net!
 • Compare them with your own data.
 • Prepare your observation missions.

To start, type any object name, such as M1, and press ENTER...
 Or easier, click in the main frame and enjoy the sky...

grid study wink north hdr multiview multi

Server selector

Others File FOV... Tools...

Mode: Generic

localhost

Construct your query, verify and execute.

Table: entity Set ra, dec

Select: All Constraints: Add new Max rows: 9999

e_id	e_name	e_type	e_rights
2MASS H (1.66um)	HIPS	data	public
2MASS H (1.66um)	original data	data	public
2MASS I (1.23um)	HIPS	data	public
2MASS I (1.23um)	original data	data	public
2MASS K (2.16um)	HIPS	data	public
2MASS K (2.16um)	original data	data	public
2MASS color J (1.23um), H (1.66um), K (2.16um)	...	data	public
2MASS color J (1.23um)	HIPS	data	public
2MASS color J (1.23um), H (1.66um), K (2.16um)	original data	data	public
2MASSG6 H (1.66um)	HIPS	data	public
2MASSG6 H (1.66um)	original data	data	public
2MASSG6 K (2.16um)	HIPS	data	public
2MASSG6 K (2.16um)	original data	data	public
2MASSG6 X (1.23um) & K (2.16um)	HIPS	data	public
2MASSG6 X (1.23um) & K (2.16um)	original data	data	public
AKARI FIS Color_Widel (140um), Wides (90um), N60	data	public	
AKARI FIS Color_Widel (140um), Wides (90um), N60	original data	data	public
AKARI FIS N160 (160um)	HIPS	data	public
AKARI FIS N160 (160um)	original data	data	public
AKARI FIS N60 (65um)	HIPS	data	public
AKARI FIS N60 (65um)	original data	data	public
AKARI FIS Widel (140um)	HIPS	data	public
AKARI FIS Widel (140um)	original data	data	public
AKARI FIS Wides (90um)	HIPS	data	public
AKARI FIS Wides (90um)	original data	data	public
ATLASGAL 850 um	HIPS	data	public
ATLASGAL 850 um	original data	data	public

Refresh query Check... SYNC Async jobs>>

```
SELECT * FROM entity, minioscore where e_id = obs_publisher_id and e_rights = 'public'
```

Reset Clear SUBMIT Close ?

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

elect entities and display them in Aladin (HiPS or classical images)

(here progenitors centers overlay – ready to be loaded)

Aladin v10.0 *** BETA VERSION (based on v10.098) ***

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Available data → 2 Command 00:00:00.0000 + 00:00:00.00000

DSS SDSS 2MASS WISE GALEX PLANCK AKARI XMM Fermi Gaia Simbad HED +

<http://alasky.u-strasbg.fr/AKARI-FIS/WideL>

218.7° x 62.06°

Welcome to Aladin, your professional sky atlas.

- Discover all astronomical data available over the net!
- Compare them with your own data.
- Prepare your observation missions.

To start, type any object name, such as M1, and press ENTER...

Or easier, click in the main frame and enjoy the sky...

Search

grid search wink north hem multiview match

e access url	e id	e name	e type	e rights	e annotation	e description	obs publisher ..	data rights	data product t...	calib
http://alasky.u...	ivo://CDS/P/2MASS/H	2MASS H (1.66um) HiPS	data	public	2MASS H (1.66um) original data	2MASS H (1.66um) hipsdata	ivo://CDS/P/2MA...	public	hips	
no access	origma0	2MASS H (1.66um) original data	data	public	2MASS J (1.23um) HiPS	origma0	ivo://CDS/P/2MA...	public	image	
http://alasky.u...	ivo://CDS/P/2MASS/J	2MASS J (1.23um) HiPS	data	public	2MASS J (1.23um) original data	2MASS has unidc hipsdata	ivo://CDS/P/2MA...	public	hips	
no access	origma1	2MASS J (1.23um) original data	data	public	2MASS J (1.23um) HiPS	origma1	ivo://CDS/P/2MA...	public	image	
http://alasky.u...	ivo://CDS/P/2MASS/K	2MASS K (2.16um) HiPS	data	public	2MASS K (2.16um) original data	2MASS has unidc hipsdata	ivo://CDS/P/2MA...	public	hips	
no access	origma2	2MASS K (2.16um) original data	data	public	2MASS K (2.16um) HiPS	origma2	ivo://CDS/P/2MA...	public	image	
http://alasky.u...	ivo://CDS/P/2MASS/color	2MASS color J (1.23um), H (1.66um), K (2.16um) HiPS	data	public	2MASS color J (1.23um), H (1.66um), K (2.16um) original data	2MASS has unidc hipsdata	ivo://CDS/P/2MA...	public	hips	
no access	origma3	2MASS color J (1.23um), H (1.66um), K (2.16um) original data	data	public	2MASS color J (1.23um), H (1.66um), K (2.16um) HiPS	origma3	ivo://CDS/P/2MA...	public	image	
http://alasky.u...	ivo://CDS/P/2MASS6/X/H	2MASS6X H (1.66um) HiPS	data	public	2MASS6X H (1.66um) original data	2MASS has unidc hipsdata	ivo://CDS/P/2MA...	public	hips	
no access	origma4	2MASS6X H (1.66um) original data	data	public	2MASS6X H (1.66um) HiPS	origma4	ivo://CDS/P/2MA...	public	image	
http://alasky.u...	ivo://CDS/P/2MASS6/X/J	2MASS6X J (1.23um) HiPS	data	public	During the final h hipsdata	2MASS6X J (1.23um) original data	ivo://CDS/P/2MA...	public	hips	
no access	origma5	2MASS6X J (1.23um) original data	data	public	2MASS6X J (1.23um) HiPS	origma5	ivo://CDS/P/2MA...	public	image	
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no access	origma6	2MASS6X K (2.16um) original data	data	public	2MASS6X K (2.16um) HiPS	origma6	ivo://CDS/P/2MA...	public	image	
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no access	origma8	AKARI FIS Color Widel (140um), Wides (90um), N60 data	data	public	AKARI FIS Color Widel (140um), Wides (90um), N60 data	origma8	ivo://CDS/P/AKAR...	public	image	
http://alasky.u...	ivo://CDS/P/AKARI/FIS/N160	AKARI FIS N160 (180um) HiPS	data	public	AKARI FIS N160 (180um) original data	AKARI FIS N160 (180um) hipsdata	ivo://CDS/P/AKAR...	public	hips	
no access	origma9	AKARI FIS N160 (180um) original data	data	public	AKARI FIS N160 (180um) HiPS	origma9	ivo://CDS/P/AKAR...	public	image	
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no access	origma10	AKARI FIS N60 (65um) original data	data	public	AKARI FIS N60 (65um) HiPS	origma10	ivo://CDS/P/AKAR...	public	image	
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no access	origma11	AKARI FIS Widel (140um) original data	data	public	AKARI FIS Widel (140um) HiPS	origma11	ivo://CDS/P/AKAR...	public	image	
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no access	origma12	AKARI FIS Wides (90um) original data	data	public	AKARI FIS Wides (90um) HiPS	origma12	ivo://CDS/P/AKAR...	public	image	
http://alasky.u...	ivo://CDS/P/ATLASGAL	ATLASGAL 850 um HiPS	data	public	AKARI FIS Wides (90um) original data	ATLASGAL 850 um hipsdata	ivo://CDS/P/ATL...	public	hips	
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opac: 100
zoom: 100

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Functions for complex queries

- See M.Nullmeier talk



Conclusion/future work

- Add provenance information for HiPS progenitors
 - Schmidt plate digitization
 - Mosaics
 - Raw data if available
- Enrich/update HiPS description in the service
- Cross combine information with HESS/CTA database

