

# ProvTAP :

A TAP service for providing IVOA provenance metadata



## ProvHIPS :

CDS ProvTAP implementation



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F.Bonnarel

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



# What is ProvTAP for ?

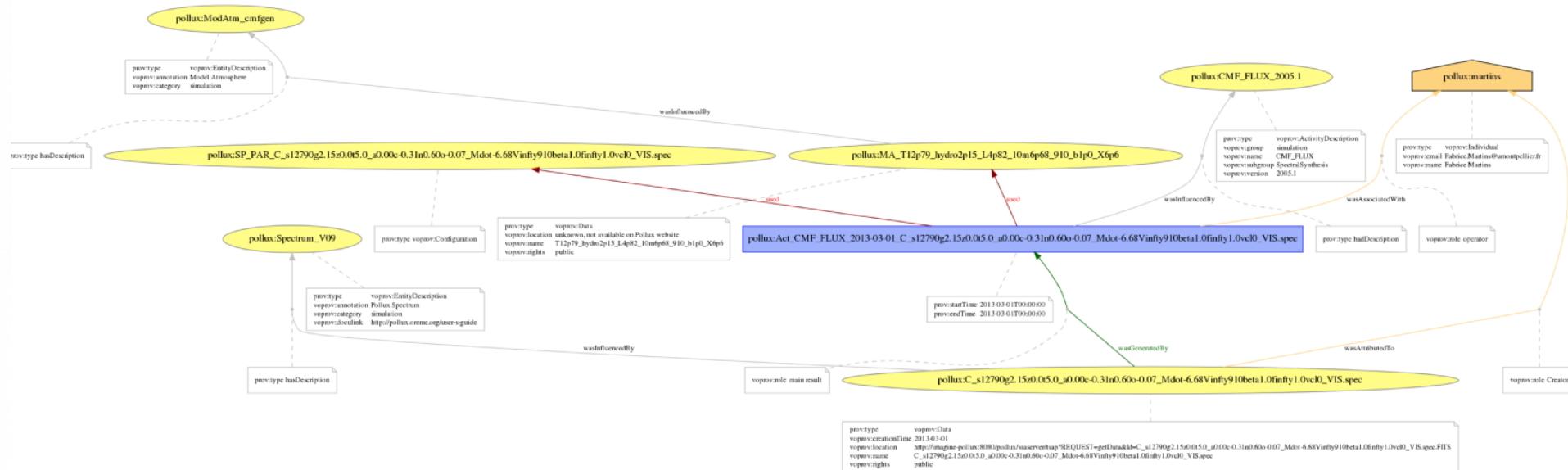
- Distributing provenance metadata for astronomical datasets
- Selecting datasets by provenance
- ProvTAP is a specification for services serializing IVOA provenance metadata model



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



# ProvTAP specification for datamodel serialisation and metadata service

- 1 ) ProvTAP is ....TAP
- 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 2019-03-22

Working group  
DM

This version  
<http://www.ivoa.net/documents/ProvTAP/20190322>

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 ProDM are described in the TAP schema tables and provides guidelines for implementing with TAP 1.1.





# ProvTAP : why TAP ?

- TAP is a specification which defines :
  - Interoperable table services, with relational view
  - Queriable via a sql-oriented language : ADQL
  - TAP is a major IVOA success.
- 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 developed at CDS
  - screenshots in next slides
- CTA/HESS implementation in development in collaboration with CDS



# Some ProvTAP tables :

## Entity

Name	ucd	utype	datatype	status
e_id	meta.id	voprov:Entity.id	char	M
e_name	meta.title	voprov:Entity.name	char	O
e_type	meta.code.class	voprov:Entity.type	char	O
e_rights	meta.code.class	voprov:Entity.rights	char	O
e_location	meta.ref.url	voprov:Entity.location	char	O
e_generated	time.start	voprov:Entity.generatedAtTime	char	O
e_invalidated	time.stop	voprov:Entity.invalidatedAtTime	char	O
e_comment	meta.description	voprov:Entity.comment	char	O
e_classtype	meta.code.class	voprov:Entity.classtype	char OPTION	M
e_value	stat.value	voprov:Entity.value	char	O
→ e_description	meta.id	voprov:Entity.description_id	reference	O

*Table 2:* Column description for Entity table. The e\_classtype column may have the following two values : "dataset" and "value"



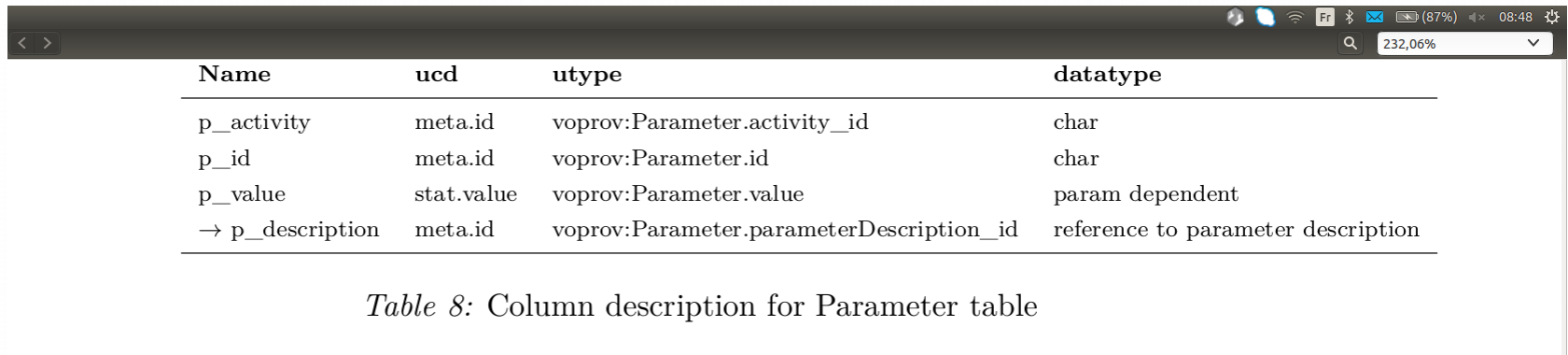
# Some ProvTAP tables : parameterDescription

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



The image shows a screenshot of a table viewer interface. At the top, there is a dark header bar with navigation arrows on the left and system icons (Wi-Fi, battery at 87%, time 08:48) on the right. Below the header, a table with four columns is displayed. The columns are labeled 'Name', 'ucd', 'utype', and 'datatype'. The table contains four rows of data. The first row is 'p\_activity' with 'meta.id' as the ucd, 'voprov:Parameter.activity\_id' as the utype, and 'char' as the datatype. The second row is 'p\_id' with 'meta.id' as the ucd, 'voprov:Parameter.id' as the utype, and 'char' as the datatype. The third row is 'p\_value' with 'stat.value' as the ucd, 'voprov:Parameter.value' as the utype, and 'param dependent' as the datatype. The fourth row is '→ p\_description' with 'meta.id' as the ucd, 'voprov:Parameter.parameterDescription\_id' as the utype, and 'reference to parameter description' as the datatype. A search bar with '232,06%' is visible in the top right corner of the table viewer.

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 :

CDS ProvTAP implementation  
For HiPS



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# 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
- Version 1 : based on Prov DM PR1 : HiPS generations
- Version 2 : work in progress : based on new datamodel, provenance of HiPS tiles for DSS images and HST images up to plates and raw data



# Simple queries to browse the content

- Entities
- Activities
- Agents
- Select parameters with associated ParameterDescriptions and activities to which they are related





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

## TAP HOME PAGE

- CDS -

### Available resources

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

### ADQL query

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**Query:**

```
SELECT *  
FROM entity;
```



**Execution mode:**  Asynchronous/Batch  Synchronous

**Format:**

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

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

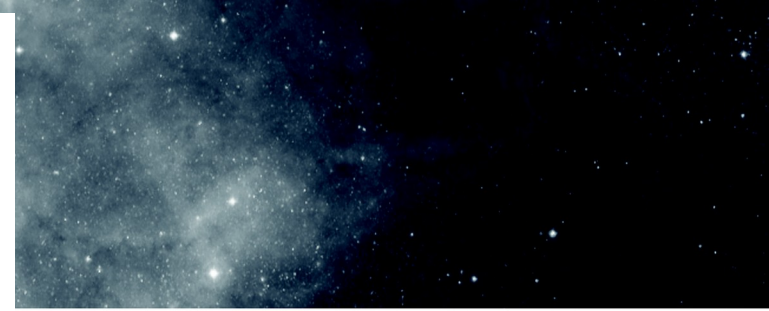
**Execute!**

# 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="e_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:
      0: "Generation of 2MASS color J (1.23um), H (1.66um), K (2.16um) HiPS"
      1: "2013-01-14T09:45Z"
      2: "2013-01-14T09:45Z"
    ▼ 4:
      0: "Generation of 2MASS color J (1.23um), H (1.66um), K (2.16um) HiPS"
      1: "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"	"Orizona 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"



## 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
2	act:CDS/P/HLA/H	Generation of HLA-H : F160W HIPS
3	act:CDS/P/HLA/H20	Generation of HLA-H20 : F139M HIPS
4	act:CDS/P/HLA/Halpha	Generation of HLA-Halpha : F656N and F657N ...
5	act:CDS/P/HLA/Hbeta	Generation of HLA-Hbeta : F487N and F486N ...
6	act:CDS/P/HLA/I	Generation of HLA-I : F814W, F791W, F785LP a...
7	act:CDS/P/HLA/J	Generation of HLA-J : F140W, F125W, F125LP a...
8	act:CDS/P/HLA/NII	Generation of HLA-NII : F658N HIPS
9	act:CDS/P/HLA/OII	Generation of HLA-OII : F375N and F373N HIPS
10	act:CDS/P/HLA/OIII	Generation of HLA-OIII : F502N HIPS
11	act:CDS/P/HLA/Palpha	Generation of HLA-Palpha : F187N HIPS
12	act:CDS/P/HLA/Palpha_c	Generation of HLA-Palpha_c : F190W HIPS
13	act:CDS/P/HLA/R	Generation of HLA-R : F702W and F675W HIPS
14	act:CDS/P/HLA/SDSSg	Generation of HLA-SDSSg : F475W HIPS
15	act:CDS/P/HLA/SDSSr	Generation of HLA-SDSSr : F625W and F622W ...
16	act:CDS/P/HLA/SDSSz	Generation of HLA-SDSSz : F850LP HIPS
17	act:CDS/P/HLA/SIII	Generation of HLA-SIII : F873N, FQ672N and F...
18	act:CDS/P/HLA/U	Generation of HLA-U : F336W, F330W, F300W, ...
19	act:CDS/P/HLA/UV	Generation of HLA-UV : F170W HIPS
20	act:CDS/P/HLA/V	Generation of HLA-V : F555W, F547W, F569W ...
21	act:CDS/P/HLA/Y	Generation of HLA-Y : F110W and F105W HIPS
22	act:CDS/P/HLA/wideUV	Generation of HLA-wideUV : F255W, F250W, F2...
23	act:CDS/P/HLA/wideV	Generation of HLA-wideV : F606W and F600LP ...
24	act:CDS/P/HST/B	Generation of HST-B includes the following fil...
25	act:CDS/P/HST/C0	Generation of HST-C0 includes the following fil...
26	act:CDS/P/HST/GOODS/b	Generation of GOODS b HIPS
27	act:CDS/P/HST/H20	Generation of HST-H20 includes the following ...
28	act:CDS/P/HST/Halpha	Generation of HST-Halpha includes the followi...
29	act:CDS/P/HST/Hbeta	Generation of HST-Hbeta includes the followin...
30	act:CDS/P/HST/I	Generation of HST-I includes the following filte...
31	act:CDS/P/HST/J	Generation of HST-J includes the following filte...
32	act:CDS/P/HST/NII	Generation of HST-NII includes the following fil...
33	act:CDS/P/HST/OII	Generation of HST-OII includes the following fil...
34	act:CDS/P/HST/OIII	Generation of HST-OIII includes the following fil...
35	act:CDS/P/HST/PHAT/F110W	Generation of HST PHAT - F110W - WFC3/IR HIPS
36	act:CDS/P/HST/Palpha_c	Generation of HST-Palpha_c includes the follo...
37	act:CDS/P/HST/R	Generation of HST-R includes the following fil...
38	act:CDS/P/HST/SDSSg	Generation of HST-SDSSg includes the followin...
39	act:CDS/P/HST/SDSSr	Generation of HST-SDSSr includes the followin...
40	act:CDS/P/HST/SDSSz	Generation of HST-SDSSz includes the followin...
41	act:CDS/P/HST/SIII	Generation of HST-SIII includes the following fil...
42	act:CDS/P/HST/U	Generation of HST-U includes the following fil...
43	act:CDS/P/HST/UV	Generation of HST-UV includes the following fil...
44	act:CDS/P/HST/V	Generation of HST-V includes the following fil...
45	act:CDS/P/HST/Y	Generation of HST-Y includes the following fil...
46	act:CDS/P/HST/other	Generation of HST-Others HIPS
47	act:CDS/P/HST/wideUV	Generation of HST-wideUV includes the followi...
48	act:CDS/P/HST/wideV	Generation of HST-wideV includes the followin...
49	act:CDS/P/Haslam408	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

Service Schema Table Columns FKeys Hints

Name:

Tables:

Description:

Service Capabilities

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

ADQL Text

Mode: Synchronous

```
1
SELECT Activity.a_id, Activity.a_name, Activity.a_annotation FROM
(SELECT WasAssociatedWith.waw_activity_id FROM WasAssociatedWith
INNER JOIN agent
ON agent.ag_id = WasAssociatedWith.waw_agent_id
WHERE agent.ag_name = 'CADC (Daniel Durand)') AS temp1
INNER JOIN Activity
ON temp1.waw_activity_id = Activity.a_id
```

Run Query

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

TOPCAT

Views Graphics Joins Windows VO Interop Help

Table List

- TAP\_2\_WasAssociatedV
- TAP\_4\_WasAssociatedV
- TAP\_6\_WasAssociatedV
- TAP\_7\_WasAssociatedV
- TAP\_8 (SELECT, WasAss
- TAP\_9\_activitydescript
- TAP\_10\_activitydescript
- TAP\_12\_activitydescript

Current Table Properties

Label: TAP\_12\_activitydescription,activity  
Location: TAP\_12\_activitydescription,activity  
Name: result\_S1542034451101  
Rows: 2  
Columns: 4  
Sort Order:   
Row Subset: All  
Activation Action: (no action)  Broadcast Row

SAMP

Messages:  Clients:

278 / 3540 M

TOPCAT(8): Table Browser

Window Subsets Help

Table Browser for 8: TAP\_12\_activitydescription,activity

	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

Window IAP Registry Edit Interop Help

Select Service Use Service Resume Job Running Jobs

Metadata

Find:

Name  Descrip Or

TAP Service (19)

- TAP\_SCHEMA (5)
  - TAP\_SCHEMA.col
  - TAP\_SCHEMA.key
  - TAP\_SCHEMA.key

Name:   
Tables:   
Description:

Service Capabilities

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

ADQL Text

Mode: Synchronous

```
1  
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'
```

Examples

Run Query

on temp1.a\_id=parameter.p\_tsaparamot ;

Mozilla Firefox

aladin.u-strasbg.fr/hips/#doc

Display Software documentation

# HiPS

Hierarchical Progressive Surveys

Introduction

HiPS in action



# 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-ugl HIPS		hips_tile_format	jpeg
4	Generation of CFHTLS-W-colored-ugl 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 NewHorizon 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 Mellinger color optical survey Hi...	2017-09-07T13:10Z	hips_tile_format	jpeg
32	Generation of Mercury MESSENGER-MDIS-LOI-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 Surve...	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 ewi-aia304-2012 HIPS		hips_tile_format	jpeg
48	Generation of Tethys Cassini-PIA18439 HIPS		hips_tile_format	jpeg
49	Generation of Titan ISS-P19658-4km HIPS	2018-01-23T14:15Z	hips_tile_format	jpeg
50	Generation of Titan SAR-HISAR-128ppd HIPS		hips_tile_format	jpeg
51	Generation of Titan Voyager HIPS	2018-01-17T17:00Z	hips_tile_format	jpeg

Table Access Protocol (TAP) Query

Window IAP Registry Edit Interop Help

Select Service Use Service Resume Job Running Jobs

Metadata

Find:

Name	Descr	Or
pd_isaparamof	VARCHAR	
pd_id	VARCHAR	
pd_name	VARCHAR	
pd_unit	VARCHAR	
pd_ucd	VARCHAR	

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
```

Run Query



# 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	hips_frame	pos.frame	galactic
2	act:CDS/P/Finkbeiner	Generation of Finkbeiner Halpaha composite s...	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 colu...	hips_frame	pos.frame	galactic
5	act:CDS/P/Haslam408	Generation of Haslam 408MHz HIPS	hips_frame	pos.frame	galactic
6	act:CDS/P/Haslam408/V2	Generation of Haslam 408MHz reprocessed Hi...	hips_frame	pos.frame	galactic
7	act:CDS/P/IRIS/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...	hips_frame	pos.frame	galactic
9	act:CDS/P/PLANCK/R2/CMB	Generation of PLANCK R2 HFI color compositio...	hips_frame	pos.frame	galactic
10	act:CDS/P/PLANCK/R2/HFI/color	Generation of PLANCK R2 nominal frequency H...	hips_frame	pos.frame	galactic
11	act:CDS/P/PLANCK/R2/HFI100	Generation of PLANCK R2 nominal frequency H...	hips_frame	pos.frame	galactic
12	act:CDS/P/PLANCK/R2/HFI143	Generation of PLANCK R2 nominal frequency H...	hips_frame	pos.frame	galactic
13	act:CDS/P/PLANCK/R2/HFI217	Generation of PLANCK R2 nominal frequency H...	hips_frame	pos.frame	galactic
14	act:CDS/P/PLANCK/R2/HFI353	Generation of PLANCK R2 nominal frequency H...	hips_frame	pos.frame	galactic
15	act:CDS/P/PLANCK/R2/HFI545	Generation of PLANCK R2 nominal frequency H...	hips_frame	pos.frame	galactic
16	act:CDS/P/PLANCK/R2/HFI857	Generation of PLANCK R2 LFI color compositio...	hips_frame	pos.frame	galactic
17	act:CDS/P/PLANCK/R2/LFI/color	Generation of PLANCK R2 nominal frequency L...	hips_frame	pos.frame	galactic
18	act:CDS/P/PLANCK/R2/LFI030	Generation of PLANCK R2 nominal frequency L...	hips_frame	pos.frame	galactic
19	act:CDS/P/PLANCK/R2/LFI044	Generation of PLANCK R2 nominal frequency L...	hips_frame	pos.frame	galactic

Service Capabilities

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

ADQL Text

Mode: Synchronous

```
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 templ
INNER JOIN
  activity
ON activity.a_id = templ.p_isaparamof
```

Examples Info

# ProvHiPS version 2

- Have the provenance of each HiPS tiles (describe original data and their « history » in term of provenance )
- A trainee student is currently tracing the provenance for DSS and HST HiPS tiles
- 14 000 drizzled and calibrated HST images headers have been parsed to extract provenance metadata



# ProvHiPS version 2 :

Some HiPS tiles provide links to original data : provide their provenance

10.0 \*\*\* BETA VERSION (based on v10.073) \*\*\*

HST B

00:42:35.48 +41:13:13.1

	RAJ2000	DEJ2000	id	access	FoV	INSTRUME	OPT ELE	DETECTOR	TIME MIN	TIME MAX	TIME EXP	WAVE MIN
■	10.67909	41.27306	<a href="#">l2vp03010 drz</a>	Display	FoV	ACS	F435W	WFC	53027.301453...	53027.332345...	2200.0	3.7E-07
■	10.68432	41.2691	<a href="#">l9am01010 drz</a>	Display	FoV	ACS	F435W	HRC	53901.9453937	53901.9615299	5576.67071996	3.7E-07
■	10.68429	41.26907	<a href="#">l9am01020 drz</a>	Display	FoV	ACS	F435W	HRC	53901.9622919	53901.9784281	5576.67071996	3.7E-07
■	10.71561	41.2775	<a href="#">l9ju01010 drz</a>	Display	FoV	ACS	F435W	WFC	53776.165378...	53776.261468...	4360.0	3.7E-07
■	10.71469	41.27828	<a href="#">l9ju06010 drz</a>	Display	FoV	ACS	F435W	WFC	54110.962538...	54111.176763...	4672.0	3.7E-07



# ProvHiPS version 2 : a look at the tables

The screenshot displays the Aladin v10.0 Server selector interface. The main window is titled "Server selector" and contains a query builder. The "Table:" dropdown is set to "TAP\_SCHEMA.tables". The "Select:" dropdown is set to "All". The "Constraints:" dropdown is set to "Add new". The "Max rows:" dropdown is set to "10". The "Mode:" dropdown is set to "Generic". The "Refresh query" button is highlighted. The "Check.." button is also visible. The "SYNC" dropdown is set to "SYNC". The "Async jobs>>" button is also visible. The "SELECT \* FROM TAP\_SCHEMA.tables" query is entered in the query field. The "Reset" button is highlighted. The "Clear" button is also visible. The "SUBMIT" button is highlighted. The "Close" button is also visible. The "table\_index" table is selected in the table list.

table_index	schema_name	table_name	table_type	description
0	provenance	entity	output	instances of Entity class
1	provenance	datasetdescript...	output	instances of DatasetDescription class
2	provenance	valuedescripti...	output	instance of ValueDescriptions class
3	provenance	activity	output	instances of Activity class
4	provenance	activitydescrip...	output	instance of Activity Descriptions
5	provenance	agent	output	instance of Agent class
6	provenance	parameter	output	instance of Parameter class
7	provenance	parameterdescr...	output	instance of Parameter Descriptions
8	provenance	used	output	instance of Used class
9	provenance	usagedescripti...	output	instance of Used Descriptions
10	provenance	wasgenerated...	output	instance of WasGeneratedBy class
11	provenance	generationdesch...	output	instance of WasGeneratedBy Descriptions
12	provenance	wasassociatedw...	output	instance of WasAssociatedWith class
13	provenance	wasattributedt...	output	instance of WasAttributedTo class
14	provenance	wasinformedby	output	instance of WasInformedBy relationship table
15	provenance	wasderivedfrom	output	instance of WasDerivedFrom relationship table
16	provenance	collection	output	instance of Collection relationship table
17	provenance	configfile	output	instances of Config file class
18	provenance	configfiledescrip...	output	instances of ConfigurationFileDescription class
19	provenance	wasconfigured...	output	instance of WasAttributedTo class
-1	TAP SCHEMA	TAP_SCHEMA.s...	table	List of schemas published in this TAP service.
-1	TAP SCHEMA	TAP_SCHEMA.ta...	table	List of tables published in this TAP service.
-1	TAP SCHEMA	TAP_SCHEMA.co...	table	List of columns of all tables listed in TAP_SCHEMA.TABLES and published in this TAP service.
-1	TAP SCHEMA	TAP_SCHEMA.k...	table	List all foreign keys but provides just the tables linked by the foreign key. To know...
-1	TAP SCHEMA	TAP_SCHEMA.ke...	table	List all foreign keys but provides just the columns linked by the foreign key. To know...



# ProvHiPS version 2

## a look at the columns

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

Aladin v10.0 Server selector

Mode: Generic

Construct your query, verify and execute.

Table: SCHEMA.key\_columns Set ra, dec

Select:  All Constraints: Add new Max rows: 10

key\_id  
from\_column  
target\_column

Refresh query Check.. SYNC Async jobs>>

```
SELECT * FROM TAP_SCHEMA.columns
```

Reset Clear SUBMIT Close

			datatype	arraysize	size	utype
3	agent	ag_email	VARCHAR	-1	-1	voprov:Agent.em
4	agent	ag_affiliation	VARCHAR	-1	-1	voprov:Agent.aff
5	agent	ag_phone	VARCHAR	-1	-1	voprov:Agent.ph
6	agent	ag_comment	VARCHAR	-1	-1	voprov:Agent.c...
7	agent	p_id	VARCHAR	-1	-1	voprov:Paramete
1	parameter	p_name	VARCHAR	-1	-1	voprov:Paramete
2	parameter	p_value	VARCHAR	-1	-1	voprov:Paramete
3	parameter	p_description	VARCHAR	-1	-1	voprov:Paramete
0	parameterdescription	pd_activitydescr	VARCHAR	-1	-1	voprov:Paramete
1	parameterdescription	pd_id	VARCHAR	-1	-1	voprov:Paramete
2	parameterdescription	pd_name	VARCHAR	-1	-1	voprov:Paramete
3	parameterdescription	pd_description	VARCHAR	-1	-1	voprov:Paramete
4	parameterdescription	pd_docuLink	VARCHAR	-1	-1	voprov:Paramete
5	parameterdescription	pd_valuetype	VARCHAR	-1	-1	voprov:Paramete
6	parameterdescription	pd_unit	VARCHAR	-1	-1	voprov:Paramete
7	parameterdescription	pd_ucd	VARCHAR	-1	-1	voprov:Paramete
8	parameterdescription	pd_utype	VARCHAR	-1	-1	voprov:Paramete
9	parameterdescription	pd_min	VARCHAR	-1	-1	voprov:Paramete
10	parameterdescription	pd_max	VARCHAR	-1	-1	voprov:Paramete
11	parameterdescription	pd_default	VARCHAR	-1	-1	voprov:Paramete
12	parameterdescription	pd_options	VARCHAR	-1	-1	voprov:Paramete
0	used	u_entity	VARCHAR	-1	-1	voprov:Used.ent
1	used	u_activity	VARCHAR	-1	-1	voprov:Used.act
2	used	u_time	VARCHAR	-1	-1	voprov:Used.ti...
3	used	u_usageDescrip	VARCHAR	-1	-1	voprov:Used.usa
0	usagedescription	ud_id	VARCHAR	-1	-1	voprov:UsageDes
1	usagedescription	ud_entitydescri	VARCHAR	-1	-1	voprov:UsageDes
2	usagedescription	ud_activitydescri	VARCHAR	-1	-1	voprov:UsageDes
3	usagedescription	ud_role	VARCHAR	-1	-1	voprov:UsageDes
4	usagedescription	ud_type	VARCHAR	-1	-1	voprov:UsageDes

Available data →  
in view out view

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

Available data →  
in view out view

hst → 442 / 23124  
→ 50 / 409  
6 / 27  
T → 6  
HLA → 3  
HST-UV: F170W  
HST-wideUV: F2  
HST-U: F336W, F  
HST-UV includes th  
HST-wideUV Includ  
HST-U includes th  
cal → 28 / 84  
T → 28  
HAT → 6  
HST PHAT - F275  
HST PHAT - F336  
HST PHAT - F475  
HST PHAT - F814  
HST PHAT - F110  
HST PHAT - F160  
GOODS → 5  
GOODS b  
GOODS v  
GOODS i  
GOODS color  
GOODS z  
HLA → 8  
HLA-B: F450W, F439W, F439W, F435W and F430W  
HLA-SDSSg: F475W  
HLA-V: F555W, F547W, F569W and F550W  
HLA-SDSSr: F625W and F622W  
HLA-R: F702W and F675W  
HLA-wideV: F606W and F600LP  
HLA-I: F814W, F791W, F785LP and F775W  
HLA-SDSSz: F850LP  
HST-B includes the following filters: F450W, F439W, F430W,  
HST-SDSSg includes the following filters: F475W  
HST-V includes the following filters: F555W, F547W, F569W and  
HST-SDSSr includes the following filters: F625W and F622W  
HST-R includes the following filters: F702W and F675W  
HST-wideV includes the following filters: F606W and F600LP  
HST-I includes the following filters: F814W, F791W, F785LP and  
HST-SDSSz includes the following filters: F850LP  
HST-Other includes the ALL the other filters not used in oth

lect: hst  
om: -- all collections --

epoch  
size  
dens.  
opac.  
zoom

Display[4]  
Display[3]  
Display[2]  
Display[1]  
Details CDS/P/HST/B  
CDS/P/HST/B

# ProvHiPS version 2

## drizzling activities for HST progenitors : names and comments

The screenshot displays the ProvHiPS web interface. The main window shows a query execution tool with the following details:

- Table:** activity
- Mode:** Generic
- Select:**  All
- Constraints:** Add new
- Max rows:** 10
- Query:** `SELECT TOP 1000 a_name,a_comment FROM activity`
- Buttons:** Refresh query, Check..., SYNC, Async jobs>>, Reset, Clear, SUBMIT, Close

Below the query window, a table of results is displayed with columns 'a\_name' and 'a\_comment'. The table contains 20 rows of data, each representing a drizzling activity. The first few rows are:

a_name	a_comment
drw7v010 drc DrizzleGeneration	Production of image  drw7v010 drc by Drizzling of the 4 calibrated ACS HST images  drw7va6q fic.fits[sc1]  drw7va6q fic.fits[sc2]  drw7va6q fic...
dq354010 drc DrizzleGeneration	Production of image  dq354010 drc by Drizzling of the 4 calibrated ACS HST images  dq354smq fic.fits[sc1]  dq354smq fic.fits[sc2]  dq354spq f...
dq346010 drc DrizzleGeneration	Production of image  dq346010 drc by Drizzling of the 4 calibrated ACS HST images  dq346yq fic.fits[sc1]  dq346yq fic.fits[sc2]  dq346yq fic...
dq342010 drc DrizzleGeneration	Production of image  dq342010 drc by Drizzling of the 4 calibrated ACS HST images  dq342f9q fic.fits[sc1]  dq342f9q fic.fits[sc2]  dq342f9q fic...
dq328buq drc DrizzleGeneration	Production of image  dq328buq drc by Drizzling of the 2 calibrated ACS HST images  dq328buq fic.fits[sc1]  dq328buq fic.fits[sc2]  dq328buq fic...
dq312010 drc DrizzleGeneration	Production of image  dq312010 drc by Drizzling of the 4 calibrated ACS HST images  dq312i5q fic.fits[sc1]  dq312i5q fic.fits[sc2]  dq312i5q fic...
dpm05030 drc DrizzleGeneration	Production of image  dpm05030 drc by Drizzling of the 4 calibrated ACS HST images  dpm05hq fic.fits[sc1]  dpm05hq fic.fits[sc2]  dpm05hq fic...
dpm05020 drc DrizzleGeneration	Production of image  dpm05020 drc by Drizzling of the 4 calibrated ACS HST images  dpm05hfq fic.fits[sc1]  dpm05hfq fic.fits[sc2]  dpm05hfq fic...
dpm05010 drc DrizzleGeneration	Production of image  dpm05010 drc by Drizzling of the 6 calibrated ACS HST images  dpm05haq fic.fits[sc1]  dpm05haq fic.fits[sc2]  dpm05haq fic...
dox05pqq drc DrizzleGeneration	Production of image  dox05pqq drc by Drizzling of the 2 calibrated ACS HST images  dox05pqq fic.fits[sc1]  dox05pqq fic.fits[sc2]  dox05pqq fic...
dox05pcq drc DrizzleGeneration	Production of image  dox05pcq drc by Drizzling of the 2 calibrated ACS HST images  dox05pcq fic.fits[sc1]  dox05pcq fic.fits[sc2]  dox05pcq fic...
dox05p8q drc DrizzleGeneration	Production of image  dox05p8q drc by Drizzling of the 2 calibrated ACS HST images  dox05p8q fic.fits[sc1]  dox05p8q fic.fits[sc2]  dox05p8q fic...
dox05p4q drc DrizzleGeneration	Production of image  dox05p4q drc by Drizzling of the 2 calibrated ACS HST images  dox05p4q fic.fits[sc1]  dox05p4q fic.fits[sc2]  dox05p4q fic...
dox01bhq drc DrizzleGeneration	Production of image  dox01bhq drc by Drizzling of the 2 calibrated ACS HST images  dox01bhq fic.fits[sc1]  dox01bhq fic.fits[sc2]  dox01bhq fic...
dox01b9q drc DrizzleGeneration	Production of image  dox01b9q drc by Drizzling of the 2 calibrated ACS HST images  dox01b9q fic.fits[sc1]  dox01b9q fic.fits[sc2]  dox01b9q fic...
dnn10p30 drc DrizzleGeneration	Production of image  dnn10p30 drc by Drizzling of the 4 calibrated ACS HST images  dnn10p3q fic.fits[sc1]  dnn10p3q fic.fits[sc2]  dnn10p3q fic...
dnn09030 drc DrizzleGeneration	Production of image  dnn09030 drc by Drizzling of the 4 calibrated ACS HST images  dnn09ba fic.fits[sc1]  dnn09ba fic.fits[sc2]  dnn09ba fic...
dnn08030 drc DrizzleGeneration	Production of image  dnn08030 drc by Drizzling of the 4 calibrated ACS HST images  dnn08yq fic.fits[sc1]  dnn08yq fic.fits[sc2]  dnn08yq fic...
dnn08020 drc DrizzleGeneration	Production of image  dnn08020 drc by Drizzling of the 4 calibrated ACS HST images  dnn08yq fic.fits[sc1]  dnn08yq fic.fits[sc2]  dnn08yq fic...
dnn07020 drc DrizzleGeneration	Production of image  dnn07020 drc by Drizzling of the 4 calibrated ACS HST images  dnn07yq fic.fits[sc1]  dnn07yq fic.fits[sc2]  dnn07yq fic...
dnn07010 drc DrizzleGeneration	Production of image  dnn07010 drc by Drizzling of the 4 calibrated ACS HST images  dnn07yq fic.fits[sc1]  dnn07yq fic.fits[sc2]  dnn07yq fic...
dne08030 drc DrizzleGeneration	Production of image  dne08030 drc by Drizzling of the 6 calibrated ACS HST images  dne08yq fic.fits[sc1]  dne08yq fic.fits[sc2]  dne08yq fic...
dnn006020 drc DrizzleGeneration	Production of image  dnn006020 drc by Drizzling of the 8 calibrated ACS HST images  dnn006cq fic.fits[sc1]  dnn006cq fic.fits[sc2]  dnn006cq fic...
dnn002020 drc DrizzleGeneration	Production of image  dnn002020 drc by Drizzling of the 8 calibrated ACS HST images  dnn002bmq fic.fits[sc1]  dnn002bmq fic.fits[sc2]  dnn002bmq fic...
dnn96h020 drc DrizzleGeneration	Production of image  dnn96h020 drc by Drizzling of the 4 calibrated ACS HST images  dnn96h5q fic.fits[sc1]  dnn96h5q fic.fits[sc2]  dnn96h5q fic...
dnn96e020 drc DrizzleGeneration	Production of image  dnn96e020 drc by Drizzling of the 4 calibrated ACS HST images  dnn96einq fic.fits[sc1]  dnn96einq fic.fits[sc2]  dnn96einq fic...
dnn96c020 drc DrizzleGeneration	Production of image  dnn96c020 drc by Drizzling of the 4 calibrated ACS HST images  dnn96cn2q fic.fits[sc1]  dnn96cn2q fic.fits[sc2]  dnn96cn2q fic...
dnn201020 drc DrizzleGeneration	Production of image  dnn201020 drc by Drizzling of the 6 calibrated ACS HST images  dnn201yq fic.fits[sc1]  dnn201yq fic.fits[sc2]  dnn201yq fic...
dnp03020 drc DrizzleGeneration	Production of image  dnp03020 drc by Drizzling of the 4 calibrated ACS HST images  dnp03rcd fic.fits[sc1]  dnp03rcd fic.fits[sc2]  dnp03rcd fic...
dnp01020 drc DrizzleGeneration	Production of image  dnp01020 drc by Drizzling of the 6 calibrated ACS HST images  dnp01fnq fic.fits[sc1]  dnp01fnq fic.fits[sc2]  dnp01fnq fic...
dls66eqq drc DrizzleGeneration	Production of image  dls66eqq drc by Drizzling of the 2 calibrated ACS HST images  dls66eqq fic.fits[sc1]  dls66eqq fic.fits[sc2]  dls66eqq fic...

The interface also features a sidebar with 'Available data' and 'Image servers' (Aladin, SkyView, Sloan, DSS, etc.), a 'Catalog servers' panel, and a bottom status bar showing '29.1" x 28.45"'. The background of the entire image is a starry space scene.

# Conclusion/future work

- Complete provenance database for HST and HST HiPS tiles.
- Connect to full HiPS and surveys as data collections
- Release the prototype before next interop
- Help users to query the database by providing embedded sql functions
- Cross combine information with other provenance projects

