

ProvTAP implementation - ProvHIPS

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ProvTAP

- ProvTAP specification is mapping IVOA Provenance data model onto the TAP schema.
- The TAP schema defines
 - table and columns names,
 - Datatypes,
 - Units,
 - Ucds
 - and utypes (model attributed id)
 - → for each model feature !



TAP SCHEMA = Entity table

The screenshot displays the TOPCAT software interface. The main window shows a metadata browser with a tree view on the left and a details pane on the right. The tree view is expanded to show the 'entity' table under the 'TAP_SCHEMA.tables' folder. The details pane shows the 'Name: provenance' and 'Description: Provenance schema'.

A secondary window titled 'TOPCAT(3): Table Browser' is open, displaying a table of columns for the 'TAP_3 TAP_SCHEMA.columns' table. The table has 11 columns and 11 rows. The columns are: column..., table..., column_name, datatype, arraysize, size, descri..., utype, unit, ucd, indexed, principal, and std. The rows contain data for each column, including values like 'entity', 'e_id', 'VARCHAR', and 'voprov:Entity.id'.

The main window also shows a 'Service Capabilities' section with 'Query Language: ADQL-2.0', 'Max Rows: 1000000 (default)', and 'Uploads: unavailable'. Below this is the 'ADQL Text' section with 'Mode: Synchronous' and a query editor containing the text: 'select * from TAP_SCHEMA.columns where table_name = 'entity''. At the bottom of the main window, there is a 'Run Query' button.

column...	table...	column_name	datatype	arraysize	size	descri...	utype	unit	ucd	indexed	principal	std
1	0	entity	e_id	VARCHAR	-1	-1	voprov:Entity.id		meta.id	0	0	0
2	1	entity	e_name	VARCHAR	-1	-1	voprov:Entity.name		meta.title	0	0	0
3	2	entity	e_type	VARCHAR	-1	-1	voprov:Entity.type		meta.code.class	0	0	0
4	3	entity	e_rights	VARCHAR	-1	-1	voprov:Entity.rights		meta.code.class	0	0	0
5	4	entity	e_location	VARCHAR	-1	-1	voprov:Entity.location		meta.ref.url	0	0	0
6	5	entity	e_generated	VARCHAR	-1	-1	voprov:Entity.generatedAtTime		time.start	0	0	0
7	6	entity	e_invalidated	VARCHAR	-1	-1	voprov:Entity.invalidatedAtTime		time.stop	0	0	0
8	7	entity	e_comment	VARCHAR	-1	-1	voprov:Entity.comment		meta.description	0	0	0
9	8	entity	e_classtype	VARCHAR	-1	-1	voprov:Entity.classtype		meta.code.class	0	0	0
10	9	entity	e_value	VARCHAR	-1	-1	voprov:Entity.value		meta.description	0	0	0
11	10	entity	e_description	VARCHAR	-1	-1	voprov:Entity.description_id		meta.id	0	0	0

Run Query

ProvTAP specification

for IVOA provenance datamodel serialisation and metadata service

- specification is currently an internal IVOA draft : significant Changes end 2021



IVOA Provenance Table Access Protocol (ProvTAP)

Version 1.0

IVOA Working Draft 2021-12-21

Working group

DM

This version

<http://www.ivoa.net/documents/ProvTAP/20211221>

Latest version

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

Previous versions

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Editor(s)

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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 schema tables and provides guidelines for implementing with TAP 1.1.

Status of this document

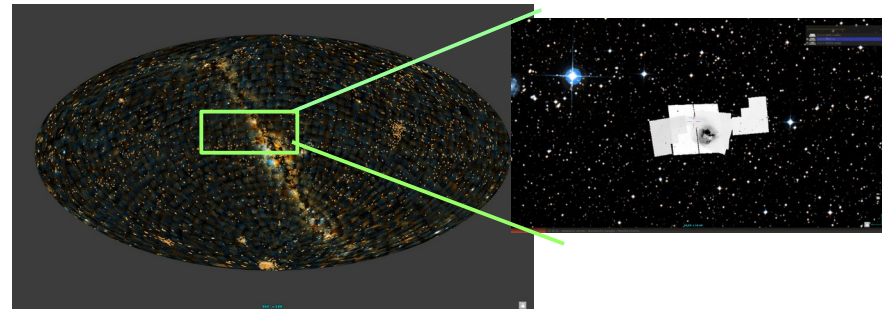
This is an IVOA Working Draft for review by IVOA members and other interested parties. It is a draft document and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use IVOA Working Drafts as reference materials or to cite them as other than "work in progress".

A list of current IVOA Recommendations and other technical documents can be found at <http://www.ivoa.net/documents/>.



ProvHiPS project

- Tracing **provenance** of HST HiPS and HiPS tiles
 - From **HiPS tiles** back to **raw HST images**,
 - through « **drizzled** » images
 - and « **calibrated** » images



- ProvHiPS is a testbed for « **On Top provenance** » for image processing in optical astronomy.
 - See examples next slides



ProvHiPS project : prototype access / Try it and test it

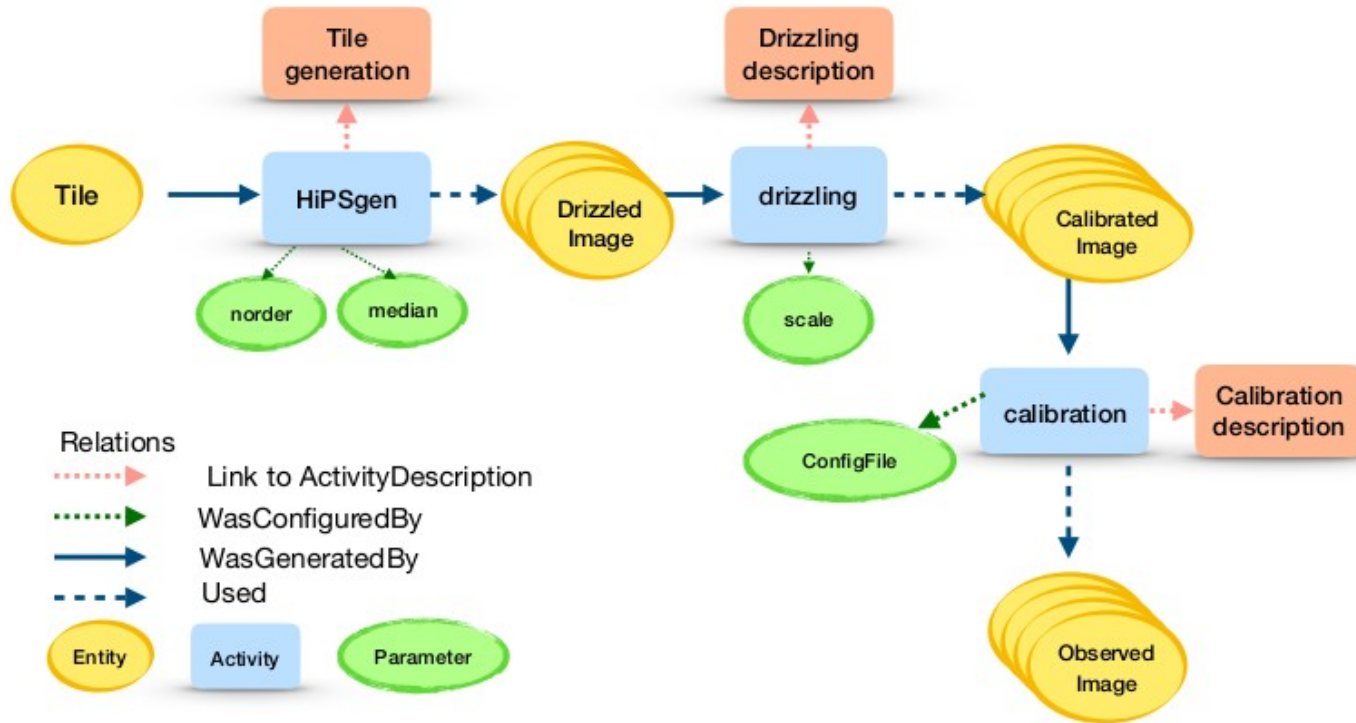
Via TapHandle : <https://saada.unistra.fr/taphandle/?url=https://saada.unistra.fr/provtap/#>

Via new smarter TapHandle:

https://taphandle.astro.unistra.fr/tapcomplex/app/Tap_Handle_MK2/taphandev.html?url=//saada.unistra.fr/provtap



«HiPS» Provenance diagram



Provenance tracking for Prov-HiPS



«HiPS» tiles at order 10 history

le Edit Image Catalog Overlay Coverage Tool View Interop Help

Available data → 27870
● in view ● out view

Collections → 27870
Image → 503
Data base → 4
Catalog → 26059
Cube → 27
Ancillary → 74
Outreach → 50
Others → 1153

Command: 05:41:17.74 -02:13:26.0

Frame: ICRS Projection: Aitoff

DSS PanSTARRS SDSS 2MASS GALEX Gaia Simbad NED +

DSS2 color

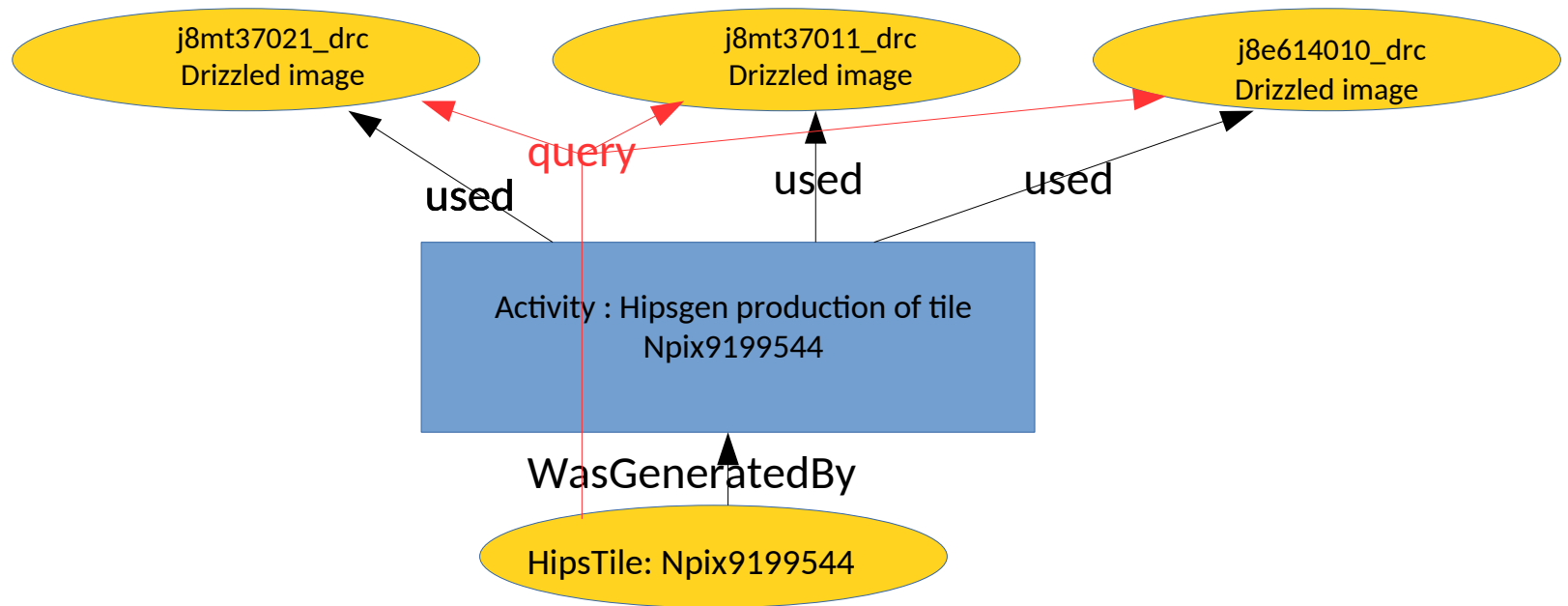
select
pan
dat
phot
draw
tag
moc
spect
filter
cross
xy
rgb
assoc
crop
cont
pixel
prop
del

epoch -
size -
dens. -
opac. -
zoom -

22:47:38.58 +

ProvHiPS ADQL query examples :

Finding out drizzled images « progenitors » of a specific HiPS tile.



ProvHiPS ADQL query examples :

Finding out drizzled images « progenitors » of a specific HiPS tile.

```
select tile.e_name, tile.e_comment, hipsgen.a_name,  
       hipsgen.a_starttime, hipsgen.a_comment, drizzle.e_name, drizzle.e_comment from  
       entity tile  
join wasgeneratedby on tile.e_id = wgb_entity  
join activity hipsgen on wgb_activity = hipsgen.a_id  
join used on hipsgen.a_id = u_activity  
join entity drizzle on drizzle.e_id = u_entity  
where tile.e_name like '%Npix9199544'
```



ProvHiPS ADQL query examples :

Finding out drizzled images « progenitors » of a specific HiPS tile.

Window TAP Registry Edit Interop Help

TOPCAT(48): Table Browser

Table Browser for 48: TAP_54_entity,wasgeneratedby,activity,used,entit...

	e_name	e_comment	a_name	a_starttime	a_comment	e_name	e_comment
1	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8e614010_drc	Drizzled HST image from ACS centered on 53.0...
2	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt37011_drc	Drizzled HST image from ACS centered on 53.0...
3	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt37021_drc	Drizzled HST image from ACS centered on 52.9...
4	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt37031_drc	Drizzled HST image from ACS centered on 52.9...
5	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt38011_drc	Drizzled HST image from ACS centered on 53.0...
6	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt38021_drc	Drizzled HST image from ACS centered on 53.0...
7	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt38031_drc	Drizzled HST image from ACS centered on 52.9...
8	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt39011_drc	Drizzled HST image from ACS centered on 53.0...
9	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt39021_drc	Drizzled HST image from ACS centered on 53.0...
10	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	j8mt39031_drc	Drizzled HST image from ACS centered on 53.0...
11	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jbwj1020_drc	Drizzled HST image from ACS centered on 53.0...
12	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc602010_drc	Drizzled HST image from ACS centered on 53.0...
13	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc602020_drc	Drizzled HST image from ACS centered on 53.0...
14	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc602030_drc	Drizzled HST image from ACS centered on 53.0...
15	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc604010_drc	Drizzled HST image from ACS centered on 53.0...
16	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc604020_drc	Drizzled HST image from ACS centered on 53.0...
17	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc609010_drc	Drizzled HST image from ACS centered on 52.9...
18	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc609020_drc	Drizzled HST image from ACS centered on 52.9...
19	HST_V_Order10_Npix9199544	Npix9199544 tile of HST-V HiPS of size 12.25 a...	HST_V_Order10_Npix9199544 Generation	2019-01-09T02:34Z	hipsGEN version 10.101 generation of Npix91...	jc611010_drc	Drizzled HST image from ACS centered on 52.9...

Total: 36 Visible: 36 Selected: 0

used
valuedescription
wasassociatedwith
unattributed

Service Capabilities

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

ADQL Text

Mode: Synchronous

```

select e.e_name, e.e_comment, a_name, a_starttime, a_comment, ee.e_name, ee.e_comment from entity e
join wasgeneratedby on e.e_id = wgb_entity
join activity on wgb_activity = a_id
join used on a_id = u_activity
join entity ee on ee.e_id = u_entity
where e.e_name like '%Npix9199544'
    
```



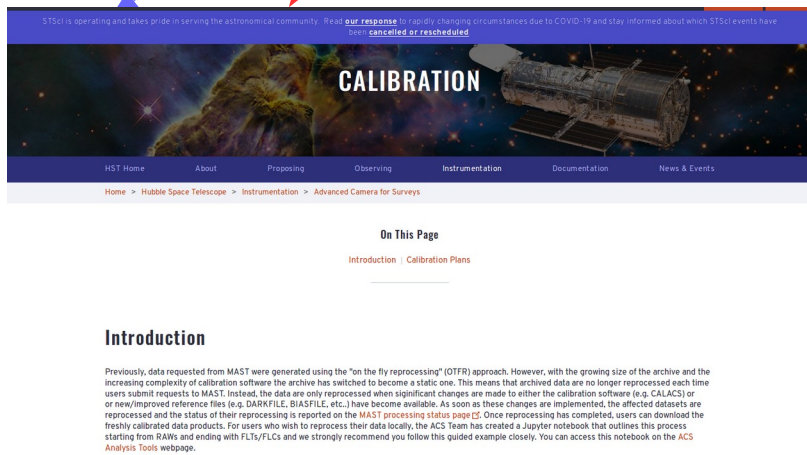
ProvHiPS ADQL query examples :

Displaying some activities documentation for specific activities through their activity description

Calibration
Activity description
-name
- docURL
-etc...

query

Activity : calibration of
Image so and so ... ;



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CALIBRATION

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Introduction

Previously, data requested from MAST were generated using the "on the fly reprocessing" (OTFR) approach. However, with the growing size of the archive and the increasing complexity of calibration software the archive has switched to become a static one. This means that archived data are no longer reprocessed each time users submit requests to MAST. Instead, the data are only reprocessed when significant changes are made to either the calibration software (e.g. CALACS) or new/improved reference files (e.g. DARKFILE, BIASFILE, etc.) have become available. As soon as these changes are implemented, the affected datasets are reprocessed and the status of their reprocessing is reported on the [MAST processing status page](#). Once reprocessing has completed, users can download the freshly calibrated data products. For users who wish to reprocess their data locally, the ACS team has created a [Jupyter notebook](#) that outlines this process starting from RAWs and ending with FLT/FLCs and we strongly recommend you follow this guided example closely. You can access this notebook on the [ACS Analysis Tools webpage](#).



ProvHiPS ADQL query examples :

Displaying some activities documentation for specific activities through their activity description

```
select anyact.a_name, anyact.a_starttime, anyact.a_comment,  
       ad_name, ad_description, ad_type, ad_subtype, ad_doculink  
from activity anyact  
join activitydescription on a_description = ad_id
```



ProvHiPS ADQL query examples :

Displaying some activities documentation for specific activities through their activity description

The screenshot displays the TOPCAT (Table Oriented PostgreSQL Client) interface. The main window shows a table with 19 rows of activity data. The columns include activity name, start time, comment, activity name, description, type, subtype, and documentation link. A browser window is open in the background showing the STScI website's calibration page.

	a_name	a_starttime	a_comment	ad_name	ad_description	ad_type	ad_subtype	ad_doculink
1	jcx015r1q_flt.fits Calibration	2018-10-26T00:00:00	Calibration of image jcx015r1q_flt.fits obtaine...	HST_CALACS Activity	HST ACS Calibration activity	Calibration	PhotometricCalibration	http://www.stsci.edu/hst/instrumentation/acs/calibration
2	j8mbncsfq_flt.fits Calibration	2018-05-31T00:00:00	Calibration of image j8mbncsfq_flt.fits obtaine...	HST_CALACS Activity				
3	jdgq04c7q_flt.fits Calibration	2018-10-27T00:00:00	Calibration of image jdgq04c7q_flt.fits obtaine...	HST_CALACS Activity				
4	jca531heq_flt.fits Calibration	2018-10-22T00:00:00	Calibration of image jca531heq_flt.fits obtaine...	HST_CALACS Activity				
5	j8f0a1b4q_flt.fits Calibration	2017-11-02T00:00:00	Calibration of image j8f0a1b4q_flt.fits obtaine...	HST_CALACS Activity				
6	j90znag1q_flt.fits Calibration	2018-06-03T00:00:00	Calibration of image j90znag1q_flt.fits obtaine...	HST_CALACS Activity				
7	j91y01p7s_flt.fits Calibration	2018-06-04T00:00:00	Calibration of image j91y01p7s_flt.fits obtaine...	HST_CALACS Activity				
8	jdl851ohq_flt.fits Calibration	2018-07-02T00:00:00	Calibration of image jdl851ohq_flt.fits obtaine...	HST_CALACS Activity				
9	jbeve1v4q_flt.fits Calibration	2018-10-15T00:00:00	Calibration of image jbeve1v4q_flt.fits obtaine...	HST_CALACS Activity				
10	j6m10c7q_flt.fits Calibration	2017-11-01T00:00:00	Calibration of image j6m10c7q_flt.fits obtaine...	HST_CALACS Activity				
11	jcat11bnq_flt.fits Calibration	2018-10-22T00:00:00	Calibration of image jcat11bnq_flt.fits obtaine...	HST_CALACS Activity				
12	jcc210e1q_flt.fits Calibration	2018-10-22T00:00:00	Calibration of image jcc210e1q_flt.fits obtaine...	HST_CALACS Activity				
13	j96012q2q_flt.fits Calibration	2018-06-05T00:00:00	Calibration of image j96012q2q_flt.fits obtaine...	HST_CALACS Activity				
14	02c14512j_npl.fits Calibration	2018-06-04T00:00:00	Calibration of image 02c14512j_npl.fits obtain...	HST_CALACS Activity				
15	j90o48b9q_flt.fits Calibration	2018-06-03T00:00:00	Calibration of image j90o48b9q_flt.fits obtaine...	HST_CALACS Activity				
16	j9h522zq_flt.fits Calibration	2018-10-12T00:00:00	Calibration of image j9h522zq_flt.fits obtained...	HST_CALACS Activity				
17	jdkb13fcq_flt.fits Calibration	2018-10-28T00:00:00	Calibration of image jdkb13fcq_flt.fits obtaine...	HST_CALACS Activity				
18	jbwjccbeq_flt.fits Calibration	2018-10-19T00:00:00	Calibration of image jbwjccbeq_flt.fits obtaine...	HST_CALACS Activity				
19	j8iy2lezq_flt.fits Calibration	2017-11-05T00:00:00	Calibration of image j8iy2lezq_flt.fits obtained...	HST_CALACS Activity				

ADQL Query:
select a_name, a_starttime, a_comment, ad_name, ad_description, ad_type, ad_subtype, ad_doculink from activity join activitydescription on a_description = ad_id

Activation Actions for 56: TAP_64_activity,activitydescription

- Send HiPS cutout
- Display image
- Display image region
- Load Table
- Plot Table
- Send FITS Image
- Send Spectrum
- Download URL
- View in Web Browser
- Delay
- Execute code
- Run system command
- Send row index

Description: Load an associated resource into a web browser

Configuration: Resource Identifier: ad_doculink

Identifier Type: auto

Browser: system browser

Status: Invoke now on row 1

Seq	Row	Status	Message
1	1	OK	http://www.stsci.edu/hst/instrumentation/acs/calibration
2	1	OK	http://www.stsci.edu/hst/instrumentation/acs/calibration
3	1	OK	http://www.stsci.edu/hst/instrumentation/acs/calibration
4	1	OK	http://www.stsci.edu/hst/instrumentation/acs/calibration
5	1	OK	http://www.stsci.edu/hst/instrumentation/acs/calibration

Finding agent and activity to whom entity is attributed and generating a given entity

- ```
select ag_name,ag_type,ag_comment, e_name,
 e_generated,e_location, e_comment, a_name,
 a_comment
from agent
join wasattributedto on ag_id = wat_agent
join entity on wat_entity = e_id
join wasgeneratedby on e_id = wgb_entity
join activity on a_id = wgb_activity
where e_name = 'j8f627010_drz.fits'
```



# Issues

- Table is denormalized : a lot of redundant information
- Loop issue : several occurrences of the same triplet (name,utype,ucd) in the same table for different « objects »
- Let's try minimum or last step provenance by creating a standardized view





# Solutions

## -1 Single step = single table (= join)

- The join is a permanent view described in the TAP schema
- Columns :
  - entity\_name, entity\_location, entity\_comment, ...
  - generating\_activity\_name, generating\_activity\_starttime, ....
  - agent\_role, agent\_name, ....
  - used\_entity\_list
- → Redundancy may be avoided if we group all used entities ids in a single cell
- → possible Recursivity



# Solutions

## Single step ( = join) – 1line per used entity

- View (in postgres)

create view last\_step\_provenance as select

e.e\_name as entity\_name, e.e\_location as entity\_location, e.e\_generated as entity\_generated,  
e.e\_invalidated as entity\_invalidated, e.e\_comment as entity\_comment,

a\_name as generating\_activity\_name, a\_starttime as generating\_activity\_starttime, a\_endtime as  
generating\_activity\_endtime, a\_comment as generating\_activity\_comment,

wat\_role as agent\_role, ag\_name as agent\_name, ag\_type as agent\_type, ag\_affiliation as agent\_affiliation,  
ag\_email as agent\_email, ag\_address as agent\_address, ag\_phone as agent\_phone, ag\_comment as  
agent\_comment,

ee.e\_name as used\_entity\_name from entity as e

**join wasgeneratedby on wgb\_entity = e.e\_id**

*join activity on a\_id = wgb\_activity*

**join used on u\_activity = a\_id**

*join entity as ee on ee.e\_id = u\_entity*

**join wasattributedto on wat\_entity = e.e\_id**

*join agent on ag\_id = wat\_agent ;*



# Solutions

Single step (= join) 1 single line per generated entity

- View (in postgres)

create view minimum\_provenance as select

e.e\_id AS entity\_id, e.e\_name AS entity\_name, e.e\_location AS entity\_location, e.e\_generated AS entity\_generated,  
e.e\_invalidated AS entity\_invalidated, e.e\_comment AS entity\_comment,

activity.a\_name AS generating\_activity\_name, activity.a\_starttime AS generating\_activity\_starttime,  
activity.a\_endtime AS generating\_activity\_endtime, activity.a\_comment AS generating\_activity\_comment,

wasattributedto.wat\_role AS agent\_role, agent.ag\_name AS agent\_name, agent.ag\_type AS agent\_type,  
agent.ag\_affiliation AS agent\_affiliation, agent.ag\_email AS agent\_email, agent.ag\_address AS agent\_address,  
agent.ag\_phone AS agent\_phone, agent.ag\_comment AS agent\_comment,

string\_agg(used.u\_entity::text, '::text) AS used\_entities\_list  
FROM entity e

**JOIN wasgeneratedby ON e.e\_id::text = wasgeneratedby.wgb\_entity::text**

*JOIN activity ON wasgeneratedby.wgb\_activity::text = activity.a\_id::text*

**join used on u\_activity = a\_id**

*join entity as ee on ee.e\_id = u\_entity*

**join wasattributedto on wat\_entity = e.e\_id**

*join agent on ag\_id = wat\_agent ; yypo*



# Solutions

## Single step = view query execution

Browser address bar: saada.u-strasbg.fr/taphandle/#

URL: http://vo-proto.cds.unistra.fr:8080/tap

Page title: voproto.cds.unistra.fr:8080/tap-provenance>entity-849

Show 10 entries

Showing 1 to 7 of 7 entries

| entity_name   | entity_location | entity_generated  | entity_invalidated | entity_comment              | generating_activity_name    | generating_activity_starttime | generating_activity_endtime | generating_activity_comment | agent_role | agent_name | agent_type   | agent_affiliation | agent_email     | agent_address          | agent_phone | agent_comment               | used_entities_list          |
|---------------|-----------------|-------------------|--------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------|-----------------------------|------------|------------|--------------|-------------------|-----------------|------------------------|-------------|-----------------------------|-----------------------------|
| j00x37020_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j00x37020_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j00 ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | file_225341.flow_225340...  |
| j02p99020_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j02p99020_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j02 ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | flow_227732.flow_227732 ... |
| j0a536010_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j0a536010_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j0a ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | flow_230234.file_230217 ... |
| j0yq07020_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j0yq07020_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j0y ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | flow_232670.flow_232668 ... |
| j0yp02020_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j0yp02020_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j0y ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | flow_233104.flow_233106 ... |
| j0zq03020_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j0zq03020_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j0z ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | file_237143.flow_237140 ... |
| j09z22010_drc |                 | 2018-12-05T02:19Z | null               | Context image of Drizzl ... | j09z22010_drc_DrizzleGe ... | 2018-12-05T02:19Z             | 2018-12-05T03:19Z           | Production of image j09 ... | creator    | STScI      | Organization | AURA              | stsci@stsci.edu | Martin Drive Baltimore | 01 25436789 | Space Telescope Science ... | flow_237526.flow_237530 ... |

SUBMIT

Select What

Where

Position

Plain Text Query

Job Control

Result Limit

100

```
select * from minimum_provenance ;
```

Widgets do not reflect the query anymore after you modified it directly



# Entity + dataset descriptions

- Finding datasetdescription for entities used by an activity started in november 2018.

```
SELECT *
FROM datasetdescription
join entity on e_description = dd_id
join used on e_id = u_entity
join activity on a_id = u_activity
where a_starttime like '2018-11%'
```



# Entity + dataset descriptions



Enter a TAP service URL or a keyword



saadaunistraprovtap>provenance>entity>753

Show 10 entries

Showing 1 to 10 of 509 entries

Search

| dd_name                     | dd_description              | dd_content             | dd_type | dd_subtype  | dd_doculink | e_id        | e_name        | e_type | e_rights | e_location | e_generated | e_invalidated | e_corr  |
|-----------------------------|-----------------------------|------------------------|---------|-------------|-------------|-------------|---------------|--------|----------|------------|-------------|---------------|---------|
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_999945  | j8qj18011_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_991418  | j8qj18021_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_1005227 | j8qj19011_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_991486  | j8qj19021_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_999407  | j92k53011_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_991490  | j92k53021_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_998845  | j92k53071_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_999407  | j92k53011_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_991490  | j92k53021_drz | null   | public   |            | null        | null          | Drizzle |
| HST_Drizzled_Images_Des ... | Coadded HST images obta ... | application/x-fits-mef | data    | coadd_calib |             | drz_998845  | j92k53071_drz | null   | public   |            | null        | null          | Drizzle |

Hide query

SUBMIT

Select What Where Position Plain Text Query Job Control

Result Limit

100

```
SELECT *
FROM datasetdescription
join entity on e_description = dd_id
join used on e_id = u_entity
join activity on a_id = u_activity
where a_starttime like '2018-11%'
```

Widgets do not reflect the query anymore after you modified it directly



# full\_entity view

```
create view provenance.full_entity AS
select entity.e_id AS full_entity_id,
entity.e_name AS full_entity_name,
entity.e_location AS full_entity_location,
entity.e_generated AS full_entity_generated,
entity.e_invalidated AS full_entity_invalidated,
entity.e_comment AS full_entity_comment,
datasetdescription.dd_name AS full_entity_desc_name,
datasetdescription.dd_type AS full_entity_desc_type,
datasetdescription.dd_subtype AS full_entity_desc_subtype,
datasetdescription.dd_doculink AS full_entity_desc_doculink
FROM entity
JOIN datasetdescription ON datasetdescription.dd_id = entity.e_description
```



# full\_entity view



Enter a TAP service URL or a keyword



- Tap Nodes
- saadaunistrafrprovtap SAU
- TAP\_SCHEMA
- ivoa
- provenance
  - entity
  - datasetdescription
  - full\_entity
  - valuedescription
  - activity
  - activitydescription
  - agent
  - parameter
  - parameterdescription
  - used
  - usagedescription
  - wasgeneratedby
  - generationdescription
  - wasassociatedwith
  - wasattributedto
  - wasinformedby
  - wasderivedfrom
  - collection
  - configfile
  - minimum\_provenance
  - last\_step\_provenance
  - configfiledescription
  - wasconfiguredby
  - history
- Goodies (not used yet)

Hide tree

## saadaunistrafrprovtap>provenance>entity>822

Show  entries

Showing 1 to 25 of 10,000 entries

Search

| full_entity_id | full_entity_name            | full_entity_location | full_entity_generated | full_entity_invalidated | full_entity_comment         | full_entity_desc_name       | full_entity_desc_type | full_entity_desc_su |
|----------------|-----------------------------|----------------------|-----------------------|-------------------------|-----------------------------|-----------------------------|-----------------------|---------------------|
| t_1            | HST_B_Norder10_Npix6977 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix6977932 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_2            | HST_B_Norder10_Npix2924 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix2924791 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_3            | HST_B_Norder10_Npix5943 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix5943052 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_4            | HST_B_Norder10_Npix7415 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix7415720 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_5            | HST_B_Norder10_Npix5145 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix5145589 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_6            | HST_B_Norder10_Npix6978 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix6978192 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_7            | HST_B_Norder10_Npix1092 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix10922601 tile of HS ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_8            | HST_B_Norder10_Npix1555 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix1555068 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_9            | HST_B_Norder10_Npix2283 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix2283782 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_10           | HST_B_Norder10_Npix1249 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix12494543 tile of HS ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_11           | HST_B_Norder10_Npix1204 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix12044279 tile of HS ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_12           | HST_B_Norder10_Npix7204 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix7204288 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| t_13           | HST_B_Norder10_Npix8534 ... | null                 | 2019-01-09T02:34Z     | null                    | Npix8534284 tile of HST ... | HST_B_Norder10              | image/fits            | hips_tile           |
| drz_484        | j8f627010_drz.fits          | null                 | null                  | null                    | Drizzled HST image from ... | HST_Drizzled_Images_Des ... | data                  | coadd_calib         |
| drz_484        | j8uq10061_drz.fits          | null                 | null                  | null                    | Drizzled HST image from ... | HST_Drizzled_Images_Des ... | data                  | coadd_calib         |

Hide query

Select What Where Position Plain Text Query Job Control

Result Limit

```
select * from full_entity
```

Widgets do not reflect the query anymore after you modified it directly



# History view (provHiPS specific)

```
create view provenance.history AS
select e.e_name AS tile,
e.e_comment AS tile_comment,
a.a_name AS tile_generation,
a.a_starttime AS tile_generation_time,
ee.e_name AS drizzle_progenitor,
ee.e_comment AS drizzle_comment,
aa.a_name AS drizzle_generation,
aa.a_starttime AS drizzle_generation_time,
eee.e_name AS calibrated_progenitor,
eee.e_comment AS calibrated_comment
FROM entity e
 JOIN wasgeneratedby w ON e.e_id= w.wgb_entity
 JOIN activity a ON a.a_id = w.wgb_activity
 JOIN used u ON u.u_activity = a.a_id
 JOIN entity ee ON ee.e_id = u.u_entity
 JOIN wasgeneratedby ww ON ww.wgb_entity = ee.e_id
 JOIN activity aa ON aa.a_id = ww.wgb_activity
 JOIN used uu ON uu.u_activity = aa.a_id
 JOIN entity eee ON eee.e_id = uu.u_entity
```



# History view (provHiPS specific)

saada.unistra.fr/taphandle?url=https://saada.unistra.fr/provtap/#

Enter a TAP service URL or a keyword

saadaunistraprovtap>provenance>entity>444

Show 10 entries Showing 1 to 9 of 9 entries

| tile                        | tile_comment                | tile_generation             | tile_generation_time | drizzle_progenitor | drizzle_comment             | drizzle_generation          | drizzle_generation_time | calibrated_progenitor    | calibrated_comment          |
|-----------------------------|-----------------------------|-----------------------------|----------------------|--------------------|-----------------------------|-----------------------------|-------------------------|--------------------------|-----------------------------|
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01040_drz.fits | Drizzled HST image from ... | jcvh01040_drz.fits_Driz ... | null                    | jcvh01pqj_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01040_drz.fits | Drizzled HST image from ... | jcvh01040_drz.fits_Driz ... | null                    | jcvh01pqj_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01050_drz.fits | Drizzled HST image from ... | jcvh01050_drz.fits_Driz ... | null                    | jcvh01ppq_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01060_drz.fits | Drizzled HST image from ... | jcvh01060_drz.fits_Driz ... | null                    | jcvh01pqw_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01050_drz.fits | Drizzled HST image from ... | jcvh01050_drz.fits_Driz ... | null                    | jcvh01plq_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01060_drz.fits | Drizzled HST image from ... | jcvh01060_drz.fits_Driz ... | null                    | jcvh01prq_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01060_drz.fits | Drizzled HST image from ... | jcvh01060_drz.fits_Driz ... | null                    | jcvh01ptq_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01050_drz.fits | Drizzled HST image from ... | jcvh01050_drz.fits_Driz ... | null                    | jcvh01pna_fit.fits[sci1] | Calibrated image obtain ... |
| HST_B_Norder10_Npix1165 ... | Npix11657683 tile of HS ... | HST_B_Norder10_Npix1165 ... | 2018-11-25T22:01Z    | jcvh01040_drz.fits | Drizzled HST image from ... | jcvh01040_drz.fits_Driz ... | null                    | jcvh01phq_fit.fits[sci1] | Calibrated image obtain ... |

Hide query

SUBMIT

Select What Where Position Plain Text Query Job Control

```
select * from history where tile like '%Npix11657683%'
```

Result Limit 100

Widgets do not reflect the query anymore after you modified it directly

# Future work

- Complete the database with more HiPS tiles and original images
- Define a view for workflow as a superactivity
- Add parameters and configuration to the database
- Collaborate for more ProvTAP implementation (CTA ? Vizier?)
- Release ProvTAP WD

