ProvHIPS :

CDS ProvTAP implementation
For Provenance of HiPS
HST HiPS as a testbed

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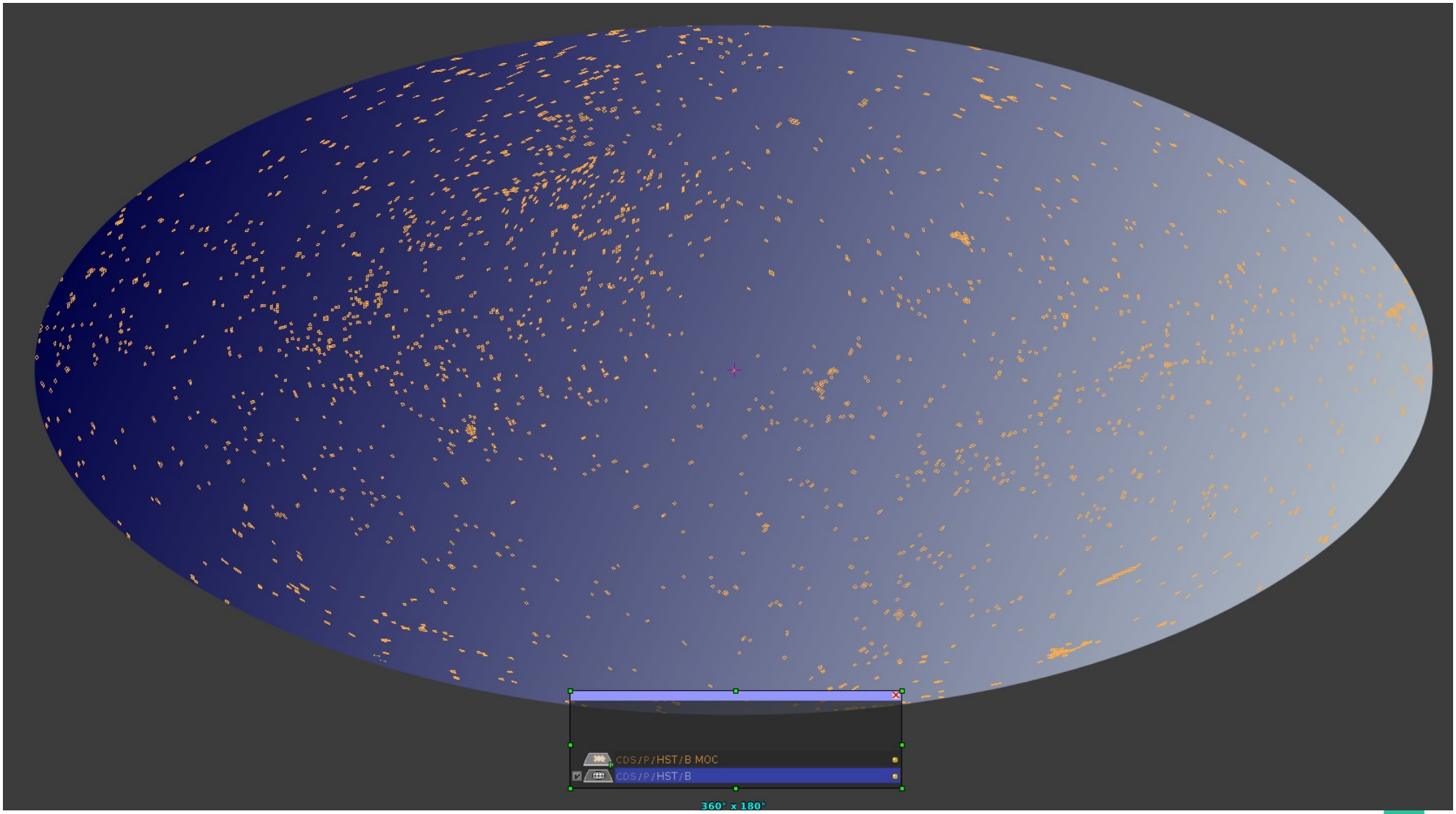
IVOA

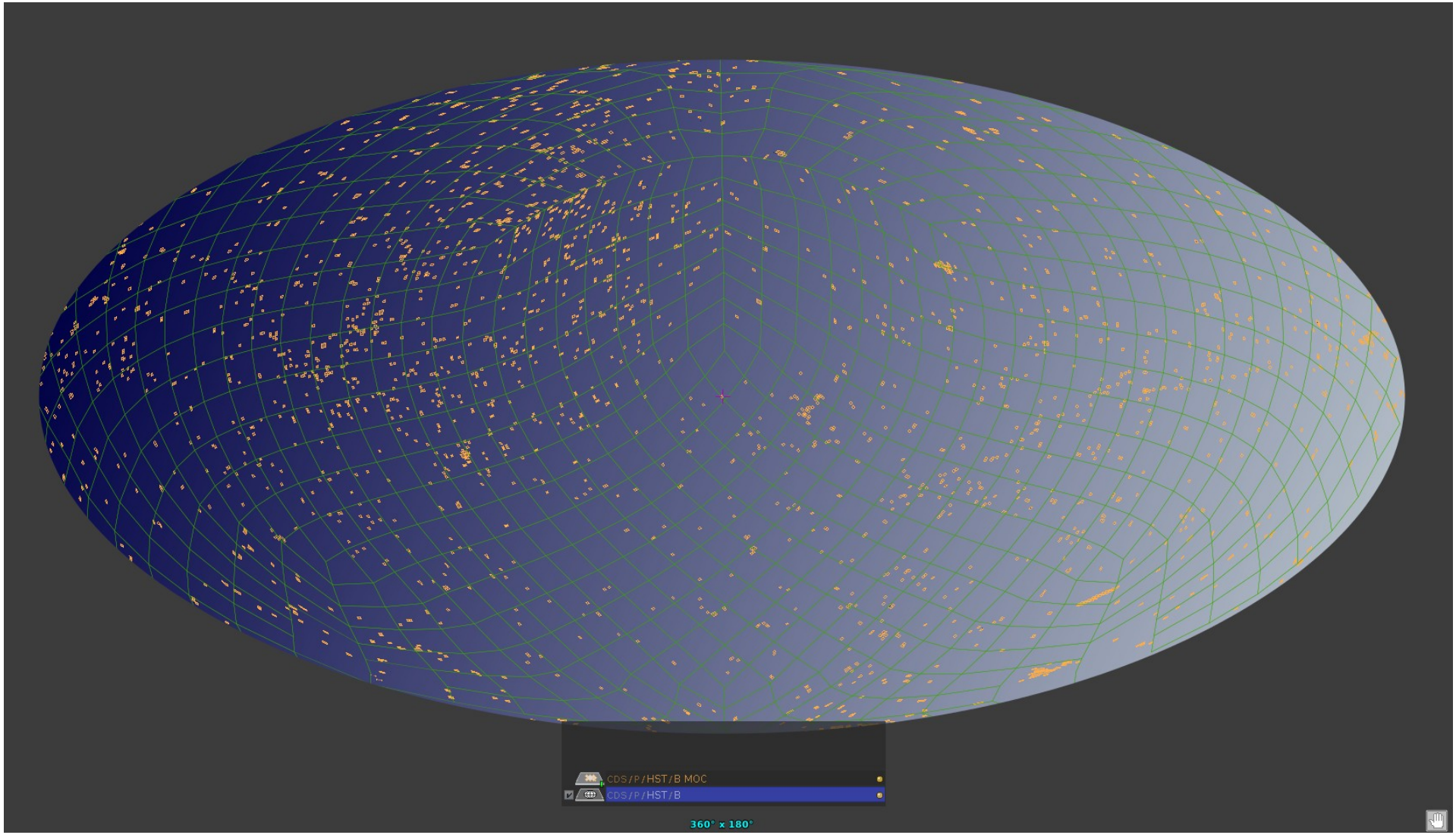
Data =
All sky views (hIPS) of HST image collections

- HST = Hubble Space Telescope.
- HST archive data organized as collection on instrument and spectral band basis
- Raw data from telescope
- First calibrated
- Then coadded by drizzling
- Drizzled images reprojected on the HealpiX grid and organized in Tiles at a given Healpix order
- User accesses the HipS through Aladin. The goal is to provide him acces to provenance information for the displayed HiPS tiles.

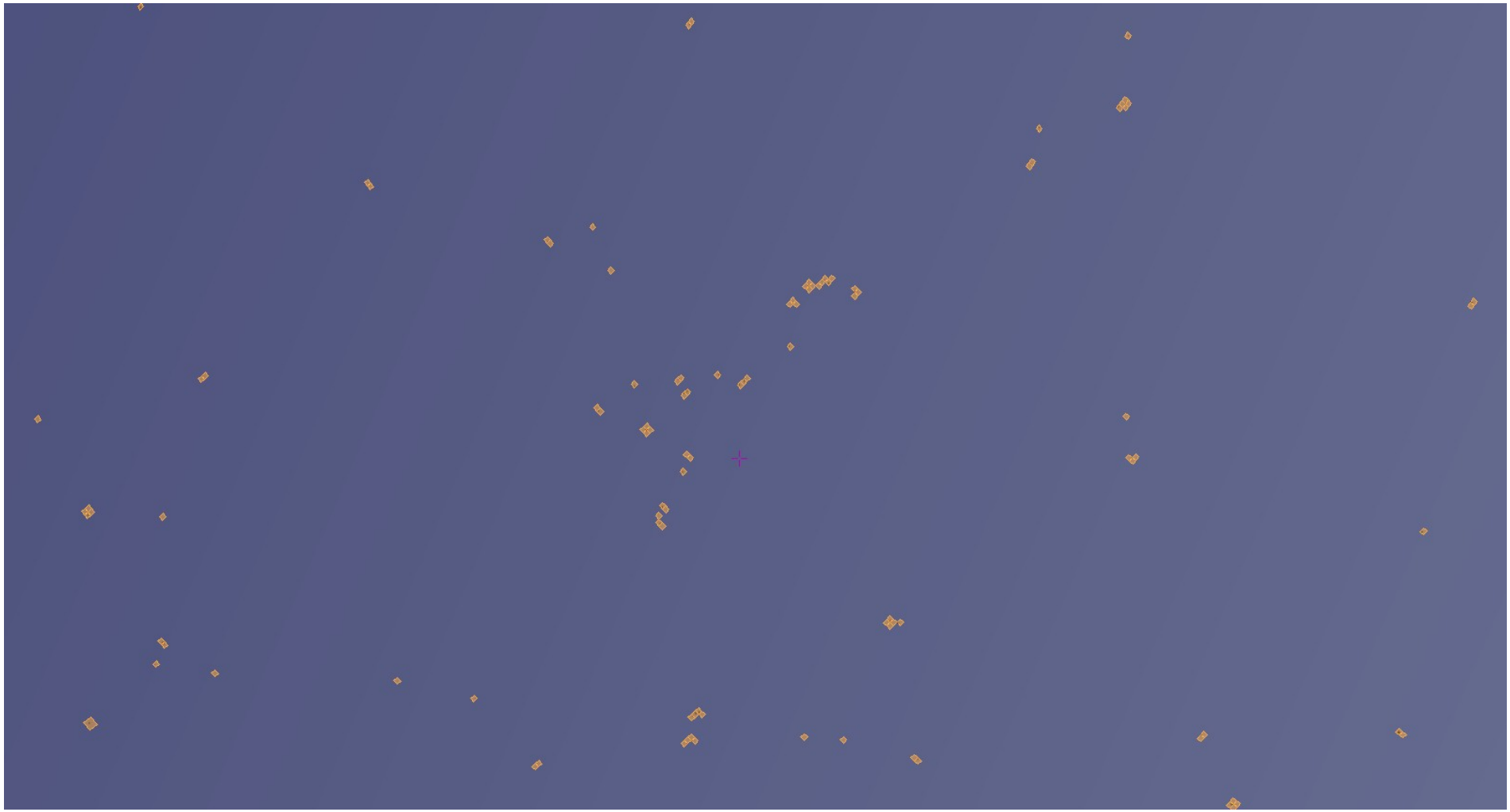
HST image collection HiPS



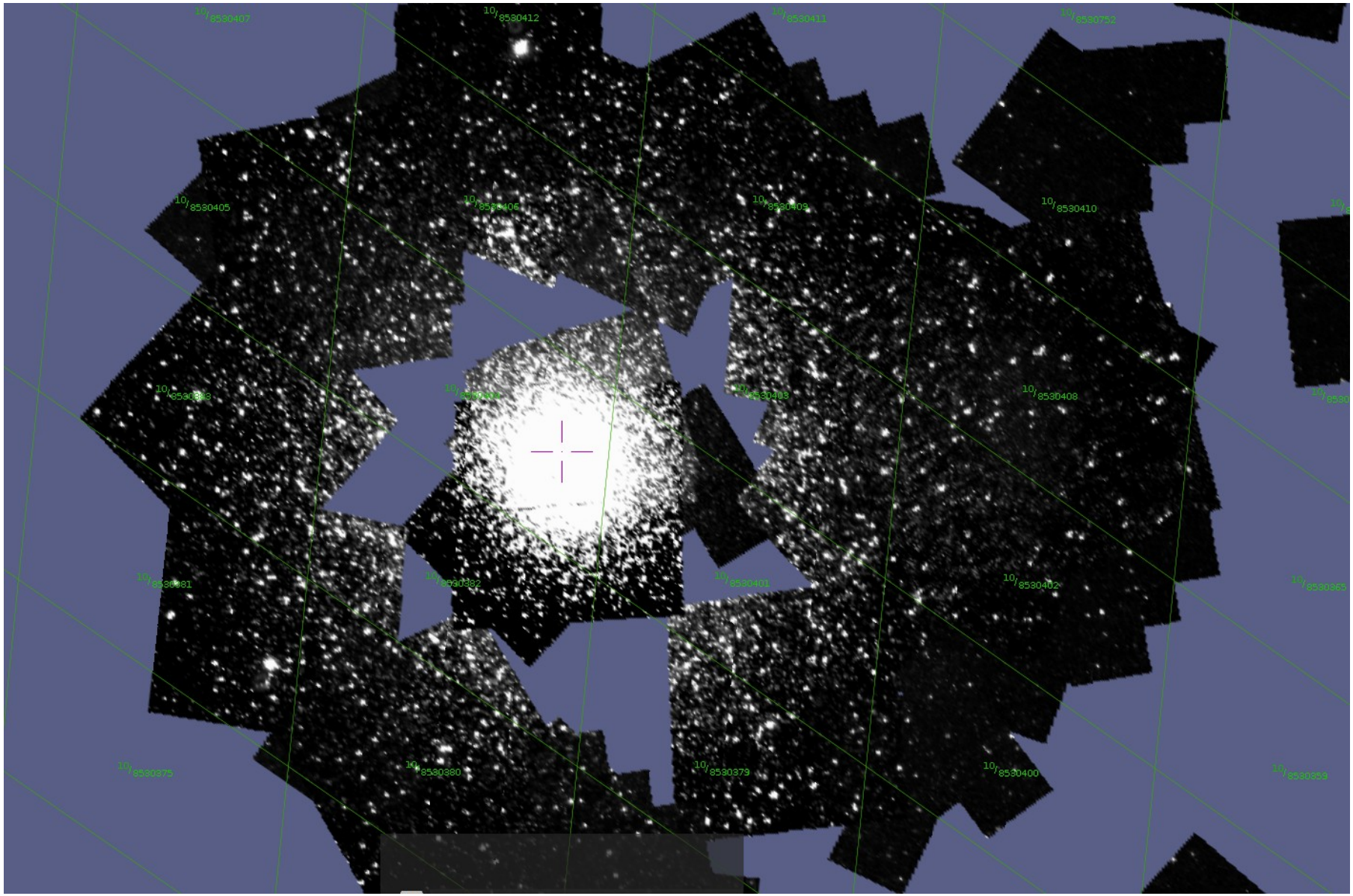
HiPS Tile Limits (in green)



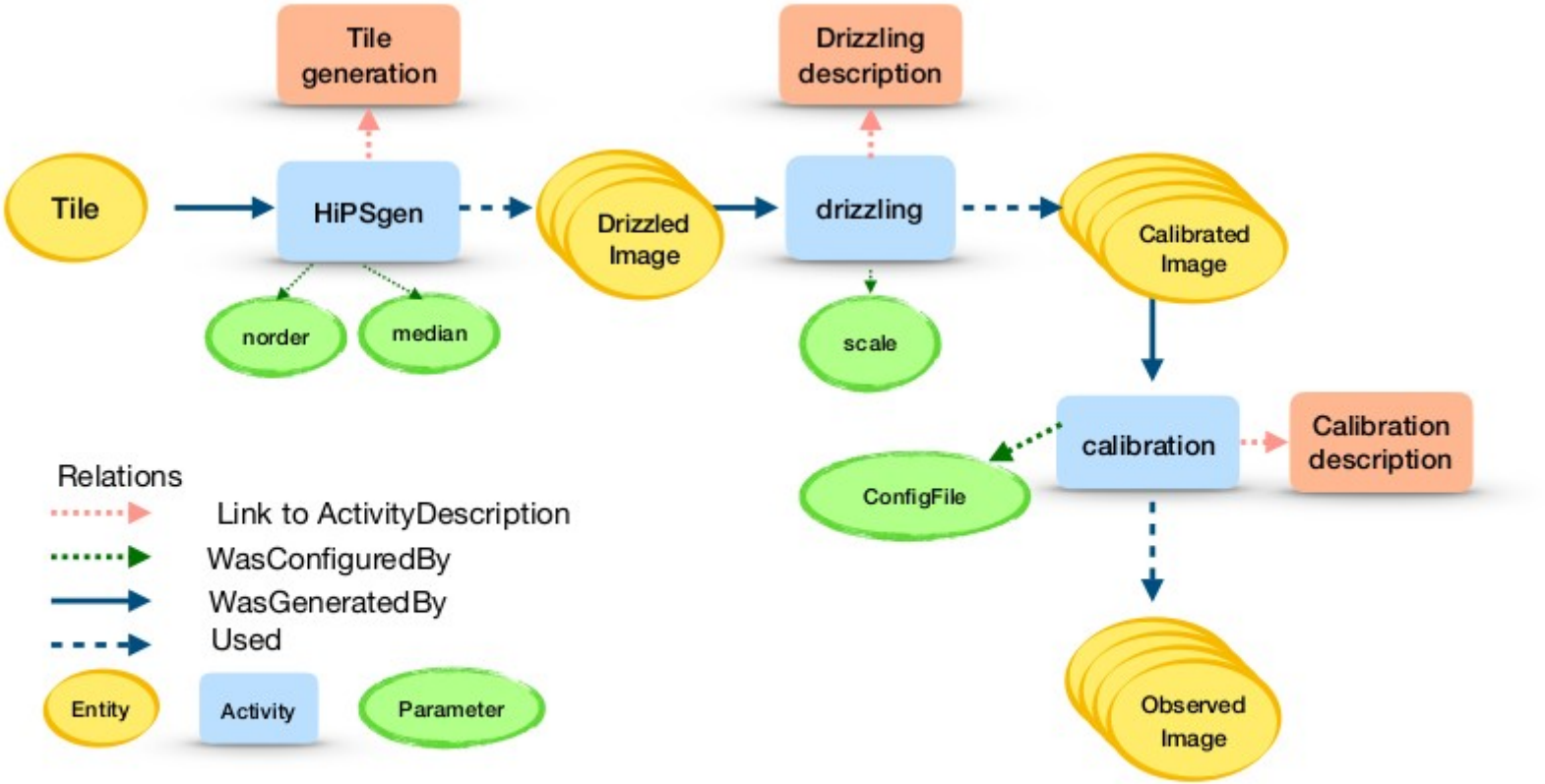
Zoom to a specific HST HiPS area (1)



Zoom to a specific HST HiPS area : NGC 104(2)



«HiPS» Provenance



Provenance tracking for Prov-HiPS

TAP : 13 Joins from hIPS tiles to raw images

SUBMIT

Select What | Where | Position | Plain Text Query | Job Control

Result Limit

100

```
SELECT e.e_name as "Tile", a.a_name as "Tile generation activity",
ee.e_name as "drizzled image", ee.e_location as "drizzled image URL", aa.a_name as "Drizzling activity",
eee.e_name as "calibrated image",eee.e_location as "calibrated image URL", aaa.a_name as "calibration",
eeee.e_name as "raw image"
FROM provenance.entity e
join provenance.wasgeneratedby w on w.wgb_entity = e.e_id
join provenance.activity a on a.a_id = w.wgb_activity
join provenance.used u on u.u_activity = a.a_id
join provenance.entity ee on ee.e_id = u.u_entity
join provenance.wasgeneratedby ww on ww.wgb_entity = ee.e_id
join provenance.activity aa on aa.a_id = ww.wgb_activity
join provenance.used uu on uu.u_activity = aa.a_id
join provenance.entity eee on eee.e_id = uu.u_entity
join provenance.wasgeneratedby www on www.wgb_entity = eee.e_id
join provenance.activity aaa on aaa.a_id = www.wgb_activity
join provenance.used uuu on uuu.u_activity = aaa.a_id
join provenance.entity eeee on eeee.e_id = uuu.u_entity
where e.e_name = 'HST_V_Order10_Npix8530404'
```

Query response : entity and activity instance names nad « locations » (URL)

Tile	Tile generation activity	drizzled image	drizzled image URL	Drizzling activity	calibrated image	calibrated image URL	calibration	raw image
HST_V_Order10_Npix85304 ...	HST_V_Order10_Npix85304 ...	j8uq70031_drz		j8uq70031_drz_DrizzleGe ...	j8uq70qnq_flt.fits[sci1]		j8uq70qnq_flt.fits_Cali ...	j8uq70qnq_flt.fits[sci1 ...
HST_V_Order10_Npix85304 ...	HST_V_Order10_Npix85304 ...	j8uq70031_drz		j8uq70031_drz_DrizzleGe ...	j8uq70qoq_flt.fits[sci1]		j8uq70qoq_flt.fits_Cali ...	j8uq70qoq_flt.fits[sci1 ...
HST_V_Order10_Npix85304 ...	HST_V_Order10_Npix85304 ...	j8uq70011_drz		j8uq70011_drz_DrizzleGe ...	j8uq70qkq_flt.fits[sci1]		j8uq70qkq_flt.fits_Cali ...	j8uq70qkq_flt.fits[sci1 ...

Tuiles

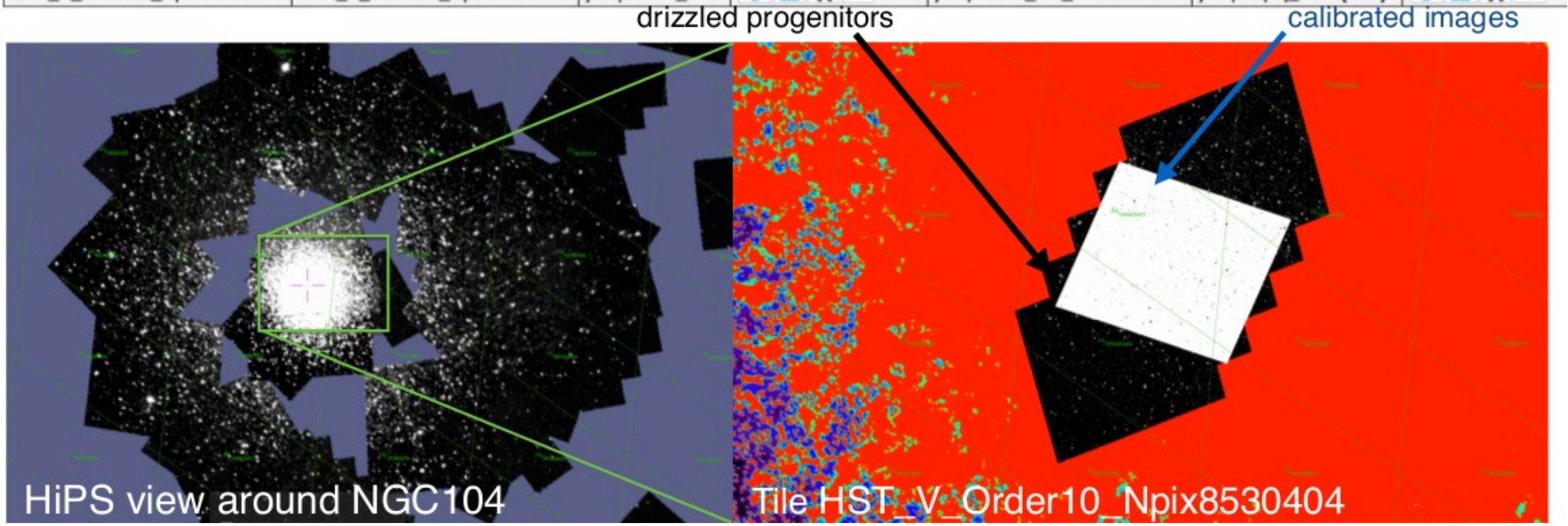
« Drizzling »
et images « drizzlées »

« calibration »

Images brutes

Overlay on HST HiPS load of drizzled image and calibrated image into Aladin

Tile	Tile generation activity	drizzled image	drizzled image URL	Drizzling activity	calibrated image	calibrated image
HST_V_Order10_Npix85304 ...	HST_V_Order10_Npix85304 ...	j8uq70031_drz		j8uq70031_drz_DrizzleGe ...	j8uq70qnq_flt.fits[sci1]	
HST_V_Order10_Npix85304 ...	HST_V_Order10_Npix85304 ...	j8uq70031_drz		j8uq70031_drz_DrizzleGe ...	j8uq70qoq_flt.fits[sci1]	
HST_V_Order10_Npix85304 ...	HST_V_Order10_Npix85304 ...	j8uq70011_drz		j8uq70011_drz_DrizzleGe ...	j8uq70qkq_flt.fits[sci1]	



More metadata : activity description

Available resources

- async
- tables
- capabilities
- availability
- sync

ADQL query

Query:

```
SELECT a_name, a_comment, a_startTime, a_endTime, ad_name, ad_type, ad_subtype,
ad_description, ad_doculink FROM activity join activitydescription on
a_description = ad_id where a_name = 'j8uq70qnq_flt.fits_Calibration'
```

Execution mode: Asynchronous/Batch Synchronous

Format: json

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')*

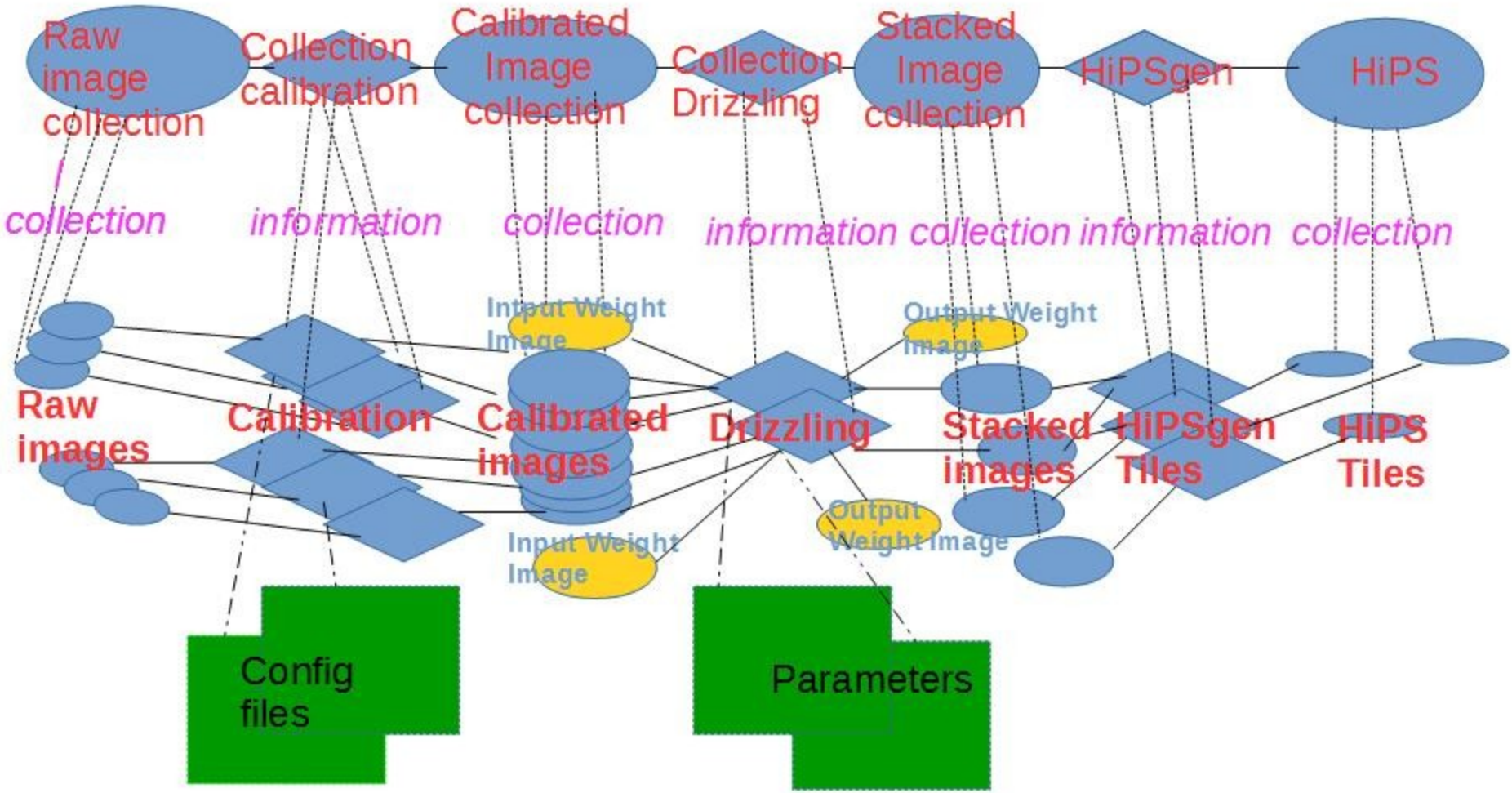
Execute!

Query Response

```
metadata:
  0:
    name:        "a_name"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "meta.title"
    utype:       "voprov:Activity.name"
  1:
    name:        "a_comment"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "meta.description"
    utype:       "voprov:Activity.comment"
  2:
    name:        "a_starttime"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "time.start"
    utype:       "voprov:Activity.startTime"
  3:
    name:        "a_endtime"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "time.end"
    utype:       "voprov:Activity.endTime"
  4:
    name:        "ad_name"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "meta.title"
    utype:       "voprov:ActivityDescription.name"
  5:
    name:        "ad_type"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "meta.code.class"
    utype:       "voprov:ActivityDescription.type"
  6:
    name:        "ad_subtype"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "meta.code.class"
    utype:       "voprov:ActivityDescription.subtype"
  7:
    name:        "ad_description"
    datatype:    "char"
    arraysize:   "*"
    ucd:         "meta.description"
```

```
data:
  0:
    0:  "j8uq70qnq_flt.fits_Calibrat
    1:  "Calibration of image j8uq70
    2:  "2018-06-02T00:00:00"
    3:  "2018-06-02T00:00:00"
    4:  "HST_CALACS_Activity"
    5:  "Calibration"
    6:  "PhotometricCalibration"
    7:  "HST ACS Calibration activit
    8:  "http://www.stsci.edu/hst/in
```

HST HiPS provenance metadata : relationships



Finding the hipsgen activity informed_by our hipsgen-tile

Available resources

- async
- tables
- capabilities
- availability
- sync

ADQL query

Query:

```
SELECT a.* from activity act
join wasinformedby on  act.a_id =wasinformedby.wib_informant
join activity a on wasinformedby.wib_informed= a.a_id

where act.a_name = 'HST_V_Order10_Npix8530404_Generation'
```

Execution mode: Asynchronous/Batch Synchronous

Format: text

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!

Page generated by TAPLibrary v2.0

Query responsee


```
metadata:
  0:
      name:        "a_name"
      datatype:    "char"
      arraysize:   "*"
      ucd:         "meta.title"
      utype:       "voprov:Activity.name"
  1:
      name:        "a_starttime"
      datatype:    "char"
      arraysize:   "*"
      ucd:         "time.start"
      utype:       "voprov:Activity.startTime"
  2:
      name:        "a_endtime"
      datatype:    "char"
      arraysize:   "*"
      ucd:         "time.end"
      utype:       "voprov:Activity.endTime"
  3:
      name:        "a_comment"
      datatype:    "char"
      arraysize:   "*"
      ucd:         "meta.description"
      utype:       "voprov:Activity.comment"
data:
  0:
    0:             "Generation of HST-V includes the following filters: F555W, F547W, F569W and F550W HiPS"
    1:             "2017-05-28T17:52Z"
    2:             "2017-05-28T17:52Z"
    3:             "Generation of HST-V includes the following filters: F555W, F547W, F569W and F550W HiPS"
```


ProvTAP :
new internal draft
available consister
with DM PR2

International Virtual Observatory Alliance

IVOA Provenance Table Access Protocol (ProvTAP)

Version 1.0

IVOA Working Draft 2019-10-07

Working group
DM
This version
http://www.ivoa.net/documents/ProvTAP/20191007
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.

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/.

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

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