

# ProvTAP specification status report



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acknowledges the « provenance » author team  
of the DM WG

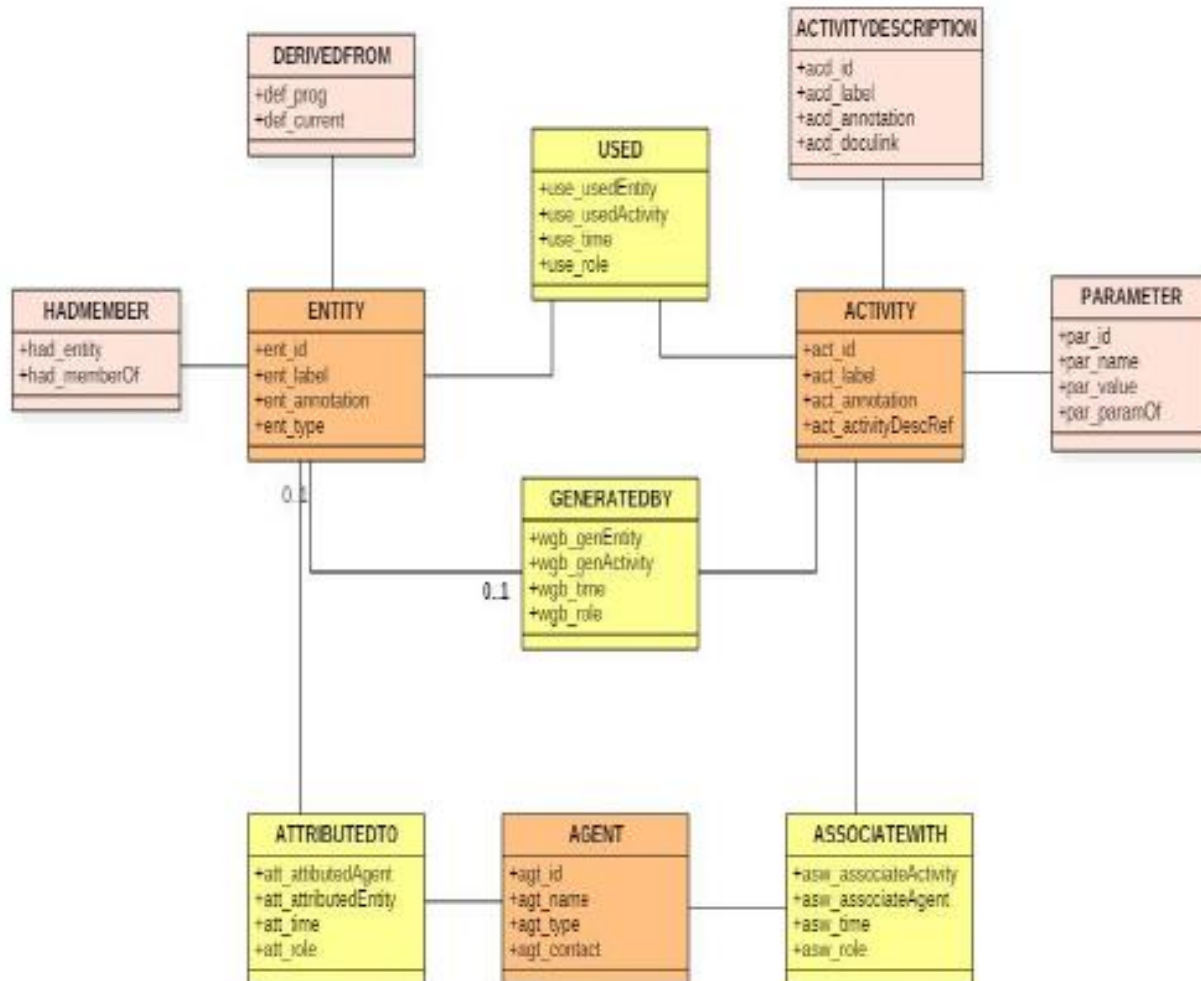




# □ ProvTAP service

- It's a TAP service
- It implements a relational view of the model in its TAP schema
- It allows selection of related entity, activity and agent details by constraining any of the model classes attributes

# Provenance: relational view





- To retrieve all activity metadata for activities sharing the same activityDescription:

```
SELECT * FROM Activity WHERE Activity.a_description = 'hipsgend_mean'
```

- To retrieve all activities associated with agent obspm:

```
SELECT WasAssociatedWith.waw_activity_id, Activity.a_name, Activity.a_annotation  
FROM WasAssociatedWith INNER JOIN Activity ON  
WasAssociatedWith.waw_activity_id = Activity.a_id WHERE  
WasAssociatedWith.waw_agent_id = 'obspm'
```

- To retrieve all entities attributed to curator agents:

```
SELECT WasAttributedTo.wat_entity_id FROM WasAttributedTo WHERE  
WasAttributedTo.wat_role = 'curator'
```



# What has been done so far ?

- Spring 2017: A prototype of a postgresql database has been developed by a student
  - Based on aladin image collections and activities
  - Use cases : schmidt plate digitizations, cutouts, RGB composition, HiPS generation
  - W3C PROV and VOTable I/O, interfaces
  - No TAP interface yet
- This allows to simulate the behavior of a TAP service



# What has been done so far ?

- Classes and columns description in the spec
- TAP schema designed



## Entity in the TAP Schema

```
▼<schema>
  <name>provenance</name>
  <description>Provenance schema</description>
  ▼<table type="output">
    <name>Entity</name>
    <description>instances of Entity class</description>
    ▼<column>
      <name>e_id</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.id</ucd>
      <utype>voprov:Entity.id</utype>
    </column>
    ▼<column>
      <name>e_name</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.title</ucd>
      <utype>voprov:Entity.name</utype>
    </column>
    ▼<column>
      <name>e_type</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.code.class</ucd>
      <utype>voprov:Entity.type</utype>
    </column>
    ▼<column>
      <name>e_rights</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.code.class</ucd>
      <utype>voprov:Entity.rights</utype>
    </column>
    ▼<column>
      <name>e_annotation</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.description</ucd>
      <utype>voprov:Entity.annotation</utype>
    </column>
    ▼<column>
      <name>e_hadMember</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.code.member</ucd>
      <utype>voprov:Entity.hadMember</utype>
    </column>
    ▼<column>
      <name>e_description</name>
      <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
      <ucd>meta.id</ucd>
      <utype>voprov:Entity.description</utype>
    </column>
    ▼<foreignKey>
      <targetTable>EntityDescription</targetTable>
      ▼<fkColumn>
        <fromColumn>e_description</fromColumn>
        <targetColumn>ed_id</targetColumn>
      </fkColumn>
    </foreignKey>
  </table>
  ▼<table type="output">
```



## Activity in ProvTAP schema

```
▼<table type="output">
  <name>Activity</name>
  <description>instances of Activity class</description>
  ▼<column>
    <name>a_id</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.id</ucd>
    <utype>voprov:Activity.id</utype>
  </column>
  ▼<column>
    <name>a_name</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.title</ucd>
    <utype>voprov:Activity.name</utype>
  </column>
  ▼<column>
    <name>a_startTime</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>time.start</ucd>
    <utype>voprov:Activity.startTime</utype>
  </column>
  ▼<column>
    <name>a_stopTime</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>time.stop</ucd>
    <utype>voprov:Activity.stopTime</utype>
  </column>
  ▼<column>
    <name>a_annotation</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.description</ucd>
    <utype>voprov:Activity.annotation</utype>
  </column>
  ▼<column>
    <name>a_votype</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.code.class</ucd>
    <utype>voprov:Activity.votype</utype>
  </column>
  ▼<column>
    <name>a_hadStep</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.code.member</ucd>
    <utype>voprov:Activity.hadStep</utype>
  </column>
  ▼<column>
    <name>a_description</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.id</ucd>
    <utype>voprov:Activity.description</utype>
  </column>
  ▼<column>
    <name>a_parameter</name>
    <dataType xsi:type="vod:TAPType">VARCHAR</dataType>
    <ucd>meta.id</ucd>
    <utype>voprov:Activity.parameter</utype>
  </column>
</table>
```

# What has been done so far ?

- Classes and columns description in the spec
- TAP schema designed
- VOTable dumps (called PROV-VOTable in the provenance SPEC)



# VOTABLE list of instances (visualized in TOPCAT)

The image displays a screenshot of the TOPCAT software interface, showing several windows with data tables and annotations. The windows are labeled with red text:

- agents**: Table Browser for 5: cdsinput-vot.xml-5. Table with columns: ident, name, type.
- entity**: Table Browser for 3: cdsinput-vot.xml-3. Table with columns: ident, label, type, annotation.
- activity**: Table Browser for 2: cdsinput-vot.xml-2. Table with columns: ident, label, start, stop, annotation.
- parameter**: Table Browser for 4: cdsinput-vot.xml-4. Table with columns: isParamOf, id, value, unit, ucd.
- WasGeneratedBy**: Table Browser for 6: cdsinput-vot.xml-6. Table with columns: head, tail, role.
- Used**: Table Browser for 7: cdsinput-vot.xml-7. Table with columns: head, tail, role.
- Max AssociatedWith**: Table Browser for 8: cdsinput-vot.xml-8. Table with columns: head, tail, role.
- Topcat interface**: A window showing a list of instances and current table properties.
- Activity description**: A window showing a table with columns: label, type, subtype, and a URL.

The 'Topcat interface' window shows a list of instances:

Ident	Name	Type
1	ivo/jcds	Centre de données astronomiques de Strasbourg
2	bonnarel	François Bonnarel
3	ivo/istsci	Spaca Telescope
4	ivo/Palomar	Palomar Schmidt Telescope
5	ivo/ESO	ESO Schmidt Telescope
6	ivo/SERC	SERC Sliding Spring Schmidt Telescope
7	ivo/gepi	GEPI
8	ivo/obsmpcal	centre analyse des images
9	buga	Mihaela Buga
10	Guibert	Jean Guibert

The 'Activity description' window shows a table with columns: label, type, subtype, and a URL.

label	type	subtype	URL
Aladin RGB image generation algorithm	RGBEncoding		http://cds.u-str...
TSICI scan	DSS2 Plate digitization	Micro densitometer	http://istsci.DS...
MAMA digitizer pipeline	Plate digitization	Micro densitometer	http://gepi/mar...
Autout service	soda	cutout	http://cds.u-str...
HIPS Generation MEAN	HIPsgen	HIPsgen_MEAN	http://cds.u-str...

# What has been done so far ?

- Classes and columns description in the spec
- TAP schema designed
- VOTable dumps (called PROV-VOTable in the provenance SPEC)
- VO-DML mappings on TOP of the schema
  - Not really useful on TOP of TAP QUERY response



# Activity VO-DML Mapping On TAP of VOTable Dump

```
</ATTRIBUTE>
-->
</INSTANCE>
</TEMPLATES>
▼<TEMPLATES tableref="a_">
▼<INSTANCE dmttype="voprov:Activity" ID="activity">
▼<PRIMARYKEY>
▼<PKFIELD>
<COLUMN dmttype="ivoa:string" ref="a_id"/>
</PKFIELD>
</PRIMARYKEY>
▼<ATTRIBUTE dmrole="voprov:Activity.id">
<COLUMN dmttype="ivoa:string" ref="a_id"/>
</ATTRIBUTE>
▼<ATTRIBUTE dmrole="voprov:Activity.name">
<COLUMN dmttype="ivoa:string" ref="a_na"/>
</ATTRIBUTE>
▼<ATTRIBUTE dmrole="voprov:Activity.startTime">
<COLUMN dmttype="ivoa:string" ref="a_sta"/>
</ATTRIBUTE>
▼<ATTRIBUTE dmrole="voprov:Activity.stopTime">
<COLUMN dmttype="ivoa:string" ref="a_sto"/>
</ATTRIBUTE>
▼<ATTRIBUTE dmrole="voprov:Activity.annotation">
<COLUMN dmttype="ivoa:string" ref="a_an"/>
</ATTRIBUTE>
▼<ATTRIBUTE dmrole="voprov:Activity.description">
<COLUMN dmttype="ivoa:string" ref="a_ds"/>
</ATTRIBUTE>
▼<!--
<ATTRIBUTE dmrole="voprov:Activity.parameter"><COLUMN dmttype="ivoa:string" ref="a_pa" /> </ATTRIBUTE>
-->
▼<COMPOSITION dmrole="voprov:Activity.used">
<EXTINSTANCES>u_</EXTINSTANCES>
</COMPOSITION>
</INSTANCE>
</TEMPLATES>
▼<TEMPLATES tableref="u_">
▼<INSTANCE dmttype="voprov:Used">
▼<CONTAINER>
▼<FOREIGNKEY>
▼<PKFIELD>
<COLUMN dmttype="ivoa:sting" ref="u_ac"/>
</PKFIELD>
<TARGETID>activity</TARGETID>
</FOREIGNKEY>
</CONTAINER>
▼<ATTRIBUTE dmrole="voprov:Used.role">
<COLUMN dmttype="ivoa:string" ref="u_ro"/>
</ATTRIBUTE>
▼<REFERENCE dmrole="voprov:Used.Entity">
▼<FOREIGNKEY>
▼<PKFIELD>
<COLUMN dmttype="ivoa:string" ref="u_en"/>
</PKFIELD>
<TARGETID>entity</TARGETID>
</FOREIGNKEY>
```

```

ESOURCE name="RGB">
<TABLE ID="a_" name="Activity" utype="voprov:Activity">
<FIELD ID="a_id" name="a_id" ucd="meta.id" datatype="char" arraysize="*" />
<FIELD ID="a_na" name="a_name" ucd="meta.title" datatype="char" arraysize="*" />
<FIELD ID="a_sta" name="a_startTime" ucd="time.start" datatype="char" arraysize="*" xtype="ISO8601" />
<FIELD ID="a_sto" name="a_stopTime" ucd="time.stop" datatype="char" arraysize="*" xtype="ISO8601" />
<FIELD ID="a_an" name="a_annotation" ucd="meta.description" datatype="char" arraysize="*" />
<FIELD ID="a_ds" name="a_description" ucd="meta.id" datatype="char" arraysize="*" />
<FIELD ID="a_pa" name="a_parameter" datatype="char" arraysize="*" />
</TABLE>
▼<DATA>
▼<TABLEDATA>
  <!-- color composition -->
  ▼<TR>
    <TD>AlaRGB1</TD>
    <TD>Aladin RGB 1</TD>
    <TD>2017-04-18T17:28:00</TD>
    <TD>2017-04-19T17:29:00</TD>
    <TD>Aladin RGB image generation for NGC 6946</TD>
    <TD>AlaRGB</TD>
  </TR>
  ▼<TR>
    <TD>AlaRGB2</TD>
    <TD>Aladin RGB 2</TD>
    <TD>2017-04-18T17:34:00</TD>
    <TD>2017-04-19T17:35:00</TD>
    <TD>Aladin RGB image generation for Messier 101</TD>
    <TD>AlaRGB</TD>
  </TR>
  ▼<TR>
    <TD>AlaRGB3</TD>
    <TD>Aladin RGB 3</TD>
    <TD>2017-04-18T17:41:00</TD>
    <TD>2017-04-19T17:42:00</TD>
    <TD>Aladin RGB image generation for Messier 33</TD>
    <TD>AlaRGB</TD>
  </TR>
  ▼<TR>
    <TD>AlaRGB4</TD>
    <TD>Aladin RGB 4</TD>
    <TD>2017-04-18T17:45:00</TD>
    <TD>2017-04-19T17:46:00</TD>
    <TD>Aladin RGB image generation for Messier 51</TD>
    <TD>AlaRGB</TD>
  </TR>
  ▼<TR>
    <TD>AlaRGB5</TD>
    <TD>Aladin RGB 5</TD>
    <TD>2017-04-18T17:47:00</TD>
    <TD>2017-04-19T17:48:00</TD>
    <TD>Aladin RGB image generation for Messier 81</TD>
    <TD>AlaRGB</TD>
  </TR>

```



```

▼<VOTABLE xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ivoa.net/xml/VOTable/v1.2" version="1.2" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.2 http://www.ivoa.net/xml/VOTable/v1.2">
  ▼<RESOURCE type="results">
    ▼<INFO>
      ADQL query = SELECT e_id,e_name,e_doculink,u_role,a_id,a_name,a_annotation FROM Entity, Used, Activity WHERE a_id="AlaRGB1" and u_activity_id=a_id and u_entity_id=u_id
    </INFO>
    ▼<TABLE ID="results">
      <FIELD ID="e_id" name="e_id" ucd="meta.id" utype="voprov:Entity.id" datatype="char" arraysize="*" />
      <FIELD ID="e_na" name="e_name" ucd="meta.title" utype="voprov:Entity.name" datatype="char" arraysize="*" />
      <FIELD ID="e_do" name="e_doculink" ucd="meta.ref.url" utype="voprov:Entity.doculink" datatype="char" arraysize="*" />
      <FIELD ID="u_ro" name="u_role" ucd="meta.code.class" utype="voprov:Used.role" datatype="char" arraysize="*" />
      <FIELD ID="a_id" name="a_id" ucd="meta.id" utype="voprov:Activity.id" datatype="char" arraysize="*" />
      <FIELD ID="a_na" name="a_name" ucd="meta.title" utype="voprov:Activity.name" datatype="char" arraysize="*" />
      <FIELD ID="a_an" name="a_annotation" ucd="meta.description" utype="voprov:Activity.annotation" datatype="char" arraysize="*" />
    </TABLE>
    ▼<DATA>
      ▼<TABLEDATA>
        ▼<TR>
          <TD>ivo://cds/P/DSS2/POSSII#POSSII.J-DSS2.143</TD>
          <TD>POSSII Blue Survey DSS2 NGC6946</TD>
          <TD>http://cds.u-strasbg.fr/aladinCutouts.gml</TD>
          <TD>voprov:input</TD>
          <TD>AlaRGB1</TD>
          <TD>Aladin RGB 1</TD>
          <TD>Aladin RGB image generation for NGC 6946</TD>
        </TR>
        ▼<TR>
          <TD>ivo://cds/P/DSS2/POSSII#POSSII.F-DSS2.143</TD>
          <TD>POSSII Red Survey DSS2 NGC6946</TD>
          <TD>http://cds.u-strasbg.fr/aladinCutouts.gml</TD>
          <TD>voprov:input</TD>
          <TD>AlaRGB1</TD>
          <TD>Aladin RGB 1</TD>
          <TD>Aladin RGB image generation for NGC 6946</TD>
        </TR>
        ▼<TR>
          <TD>ivo://cds/P/DSS2/POSSII#POSSII.N-DSS2.143</TD>
          <TD>POSSII Infra Red Survey DSS2 NGC6946</TD>
          <TD>http://cds.u-strasbg.fr/aladinCutouts.gml</TD>
          <TD>voprov:input</TD>
          <TD>AlaRGB1</TD>
          <TD>Aladin RGB 1</TD>
          <TD>Aladin RGB image generation for NGC 6946</TD>
        </TR>
      </TABLEDATA>
    </DATA>
  </TABLE>
</RESOURCE>
</VOTABLE>

```

## ProvTAP respons for an ADQL Query

## □ Future plans

- Extract ProvTAP from DM provenance specification
- Rename PROV-VOTable in ProvTAP VOTable dump or whatever
- Implement a ProvTAP service at CDS for next interop