



NED Activities Update: TAP

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NED's Current Holdings

| | |
|---------------|----------------------------------|
| 391,330,917 | Distinct Astrophysical Objects |
| 451,169,947 | Multiwavelength Object Cross-IDs |
| 742,326,710 | Positional Data Points |
| 4,980,374,077 | Photometric Data Points |
| 608,833,162 | Diameters |
| 11,324,496 | Redshifts |

<https://ned.ipac.caltech.edu/ui/?q=CurrentHoldings>



Current VO Services

- * SCS - Simple Cone Search
- * SIAv1 - Simple Image Access v1.
- * SIAv2 - Simple Image Access v2.
- * SED, based in SSA standards, service.
- * 20 NED's specific "CGI/URL-based " services (cleverly accessed and adapted world-wide).

And now:

- * TAP – Table Access Protocol



TAP in NED

- * Allows users to query the NED Object Directory (*ned_objdir*) directly from applications
- * Description and examples for using NED's TAP :
<https://ned.ipac.caltech.edu/tap>
- * Main query parameters
QUERY, LANG, REQUEST, FORMAT (optional), PHASE (optional, async query only), EXECUTIONDURATION (optional), and MAXREC (optional)



TAP in NED Details

- * TAP in NED provides a view of *Object Directory*
A view of the NED astrophysical objects list
and key properties
- * Same information accessible using ObjectLookup
- * ObjectLookup has replaced **NEDsrv**
for name-resolver services
(Same answers, now in JSON).



TAP in NED Details

- * NED-TAP is implemented with:
 - CDS TAP+UWS+ADQL libraries
Including
[ADQLLib-1.4](#) (for ADQL-2.0)
[UWSLib-4.2](#) (for UWS-1.0)
TAP 2.1 (for TAP-1.0)

- * NED Postgresql Q3C Translator module
 - There is a *NED specific* component to this.
Anticipate making portions that are generally applicable.
Updates in the fall.



NED's TAP Service

- * Keywords for an ADQL Query.
QUERY=SELECT {columns} FROM {table} WHERE {geometric constraint} AND ({sql constraint})
{order by}{group by} {having}
- * table_name Description
- * TAP_SCHEMA.schemas
List of schemas published in this TAP service
- * TAP_SCHEMA.tables
List of tables published in this TAP service \
- * TAP_SCHEMA.columns
List of columns of all tables
- * TAP_SCHEMA.keys
List all foreign keys but provides just the tables linked by the foreign key.
To know which columns of these tables are linked, see in TAP_SCHEMA.key_columns using the key_id
- * TAP_SCHEMA.key_columns
List all foreign keys but provides just the columns linked by the foreign key.
To know the table of these columns, see in TAP_SCHEMA.keys using the key_id



Reference Clients

* TopCat

* curl

```
➤ curl -o out.txt
```

```
"https://ned.ipac.caltech.edu/tap/  
sync?QUERY=
```

```
SELECT%20*%20FROM%20TAP_SCHEMA.tables
```

```
&REQUEST=doQuery
```

```
&LANG=ADQL
```

```
&FORMAT=text"
```


Insert into TAP URL <https://ned.ipac.caltech.edu/tap>, use it:

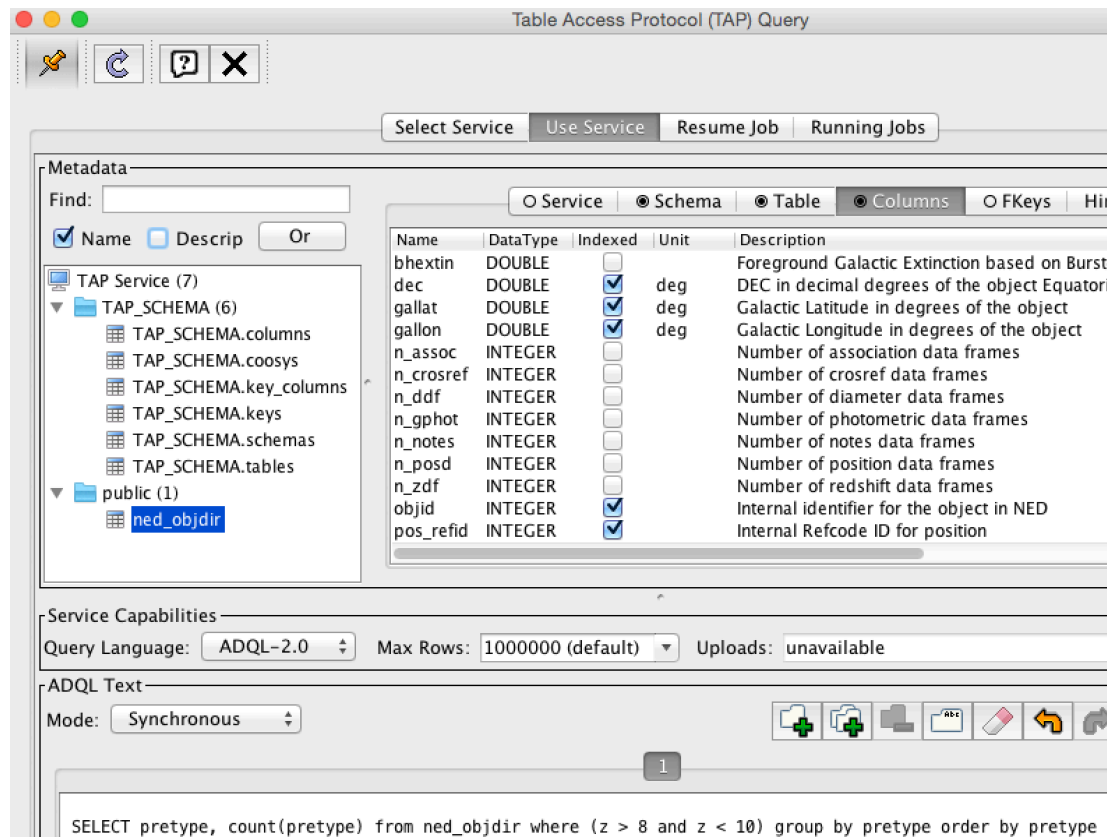


Table Access Protocol (TAP) Query

Select Service Use Service Resume Job Running Jobs

Metadata

Find:

Name Descrip Or

TAP Service (7)

- TAP_SCHEMA (6)
 - TAP_SCHEMA.columns
 - TAP_SCHEMA.coosys
 - TAP_SCHEMA.key_columns
 - TAP_SCHEMA.keys
 - TAP_SCHEMA.schemas
 - TAP_SCHEMA.tables
- public (1)
 - ned_objdir

| Name | Data Type | Indexed | Unit | Description |
|-----------|-----------|-------------------------------------|------|---|
| bhextin | DOUBLE | <input type="checkbox"/> | | Foreground Galactic Extinction based on Burst |
| dec | DOUBLE | <input checked="" type="checkbox"/> | deg | DEC in decimal degrees of the object Equatori |
| gallat | DOUBLE | <input checked="" type="checkbox"/> | deg | Galactic Latitude in degrees of the object |
| gallon | DOUBLE | <input checked="" type="checkbox"/> | deg | Galactic Longitude in degrees of the object |
| n_assoc | INTEGER | <input type="checkbox"/> | | Number of association data frames |
| n_crosref | INTEGER | <input type="checkbox"/> | | Number of crosref data frames |
| n_ddf | INTEGER | <input type="checkbox"/> | | Number of diameter data frames |
| n_gphot | INTEGER | <input type="checkbox"/> | | Number of photometric data frames |
| n_notes | INTEGER | <input type="checkbox"/> | | Number of notes data frames |
| n_posd | INTEGER | <input type="checkbox"/> | | Number of position data frames |
| n_zdf | INTEGER | <input type="checkbox"/> | | Number of redshift data frames |
| objid | INTEGER | <input checked="" type="checkbox"/> | | Internal identifier for the object in NED |
| pos_refid | INTEGER | <input checked="" type="checkbox"/> | | Internal Refcode ID for position |

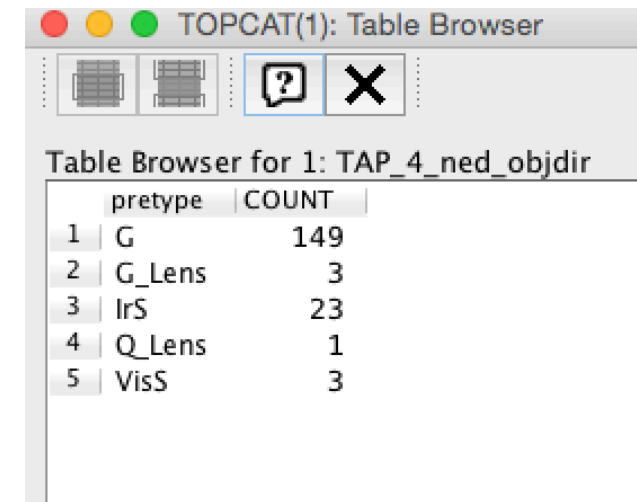
Service Capabilities

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

ADQL Text

Mode: Synchronous

```
SELECT pretype, count(pretype) from ned_objdir where (z > 8 and z < 10) group by pretype order by pretype
```



TOPCAT(1): Table Browser

Table Browser for 1: TAP_4_ned_objdir

| pretype | COUNT |
|----------|-------|
| 1 G | 149 |
| 2 G_Lens | 3 |
| 3 IrS | 23 |
| 4 Q_Lens | 1 |
| 5 VisS | 3 |



NED

TAP in NED: Issues and Future

Areas of concern / improvement:

- TAP does not allow for data-center job control
 - A single user can negatively impact the system
- ADQL v. SQL people hear that ADQL is a 'super-set' of SQL
- Depending on take-up, NED may expand TAP access to directories and individual data frames (e.g. Photometry Table now delivered via the **SED** service).



References

* **Table Access Protocol Version 1.0**

<http://www.ivoa.net/documents/TAP/20100327/>

* **IVOA Astronomical Data Query Language Version 2.00**

<http://www.ivoa.net/documents/latest/ADQL.html>

* **Universal Worker Service Pattern Version 1.0**

<http://www.ivoa.net/documents/UWS/20101010/index.html>

* **Description and examples for using NED's TAP:**

<https://ned.ipac.caltech.edu/tap>



Additional



EXAMPLES of the queries.

- * **curl -o out.txt "https://ned.ipac.caltech.edu/tap/sync? QUERY=SELECT+*+FROM +TAP_SCHEMA.tables&REQUEST=doQuery&LANG=ADQL &FORMAT=text"**
- * **curl -o out.txt "https://ned.ipac.caltech.edu/tap/sync? QUERY=SELECT+*+FROM+TAP_SCHEMA.columns +WHERE +table_name='public.ned_objdir'&REQUEST=doQuery&LANG=ADQL&FORMAT=text"**



Cont-d Examples

* Asynchronous Cone Search

```
curl -k -i -Ls -o /dev/null -w "%{url_effective}" -H Content-Type:application/x-www-form-urlencoded -XPOST --data "query=SELECT+count(*)+FROM+ned_objdir+WHERE+CONTAINS(POINT('J2000',ra,dec),CIRCLE('J2000',66.76957,26.101,1))=1&LANG=ADQL&PHASE=RUN&REQUEST=doQuery&EXECUTIONDURATION=100&FORMAT=text"
```

<https://ned.ipac.caltech.edu/tap/async>

The output:

https://ned.ipac.caltech.edu/tap/async/1518723190466A

Check progress:

curl https://ned.ipac.caltech.edu/tap/async/1518723190466A/phase

Get the result:

curl <https://ned.ipac.caltech.edu/tap/async/1518723190466A/results/result>



Cont-d Examples

For using ADQL language from Application like TOPCAT or other :

- SELECT pretype, count(pretype) from ned_objdir where (z > 8 and z < 10) group by pretype order by pretype*
- SELECT ra, dec, z FROM ned_objdir WHERE (z > 9 and z < 10) order by z, ra*
- All the useful examples in
<https://ned.ipac.caltech.edu/tap>*