VOTable agenda

3 topics:

- The VOTable-STC connection:
  - Version 1.01 published on the IVOA pages
- The last step to VOTable1.2
  - should move to the Recommendation procedure
- Future of VOTable WG

The VOTable-STC Connection

- Is part of the more generic problem on *how to refer to datamodels in a VOTable ?*
- VOTable is *not* a data model – more a container to convey efficiently large sets of data without losing their accurate definition
- The space and time components are quite important, and therefore the STC is an ideal (and useful) test bed of VOTable-data model connection.

Referencing Models in VOTable

The constraints:

- we want to keep in VOTable accurate metadata
- keep VOTable flexible *(it is impossible to add into a VOTable document all the various XML codes related to all data models developed by the VO)*

$\Rightarrow$ VOTable document therefore *refers* to data models without *including* them

Utypes: definition

- in VOTable schema: **utype** is a non-mandatory attribute of any RESOURCE TABLE FIELD PARAM GROUP
  - originally created for DAL needs
  - is an acceptable attribute wherever the ucd accepted
  - contrary to the ucd, gives a fully detailed meaning of the field, parameter or group
    - ucd = broad semantics, typically used for data mining
    - utype = detailed semantics, refers to a data model

Utypes: syntax

prefix:element.element.element...

- prefix declared in the xlmns *(versioning)*
- dot-separated list of the elements in the hierarchy of the data model
- it is hoped that the same syntax is accepted across all IVOA components

Example from STC model

- stc:AstroCoords.Position2D.Value2.C1

stc = prefix which refers to the data model; a definition of the exact data model used specified with *xmlns* convention

```
<AstroCoords>
  <Position2D>
    <Value2>
      <C1>180</C1>
      <C2>-60</C2>
    </Value2>
  </Position2D>
</AstroCoords>
```

Example in VOTable

A right ascension parameter could be written in VOTable as:

<PARAM name=”RA” datatype=”double” unit=”deg”
utype=”stc:AstroCoords.Position2D.Value2.C1”
value=”180” />

Generalisation (1)

- Value in attribute:

```
<Elem1>
  <Elem2>
    <Elem3 attr1=”v1”>
```

utype=”Elem1.Elem2.Elem3.attr1”
value=”v1”

Generalisation (2)

- Empty elements (enumeration):

```
<AstroCoordSystem>
  <SpaceFrame>
    <CoordRefFrame>
      <ICRS/>
```

utype="AstroCoordSystem.SpaceFrame.CoordRefFrame"
value="ICRS"

STC Connection

- STC is an essential component to precise the conventions of dates, locations, coordinate systems – now an IVOA Recommendation
- is of interest in most VO components
- in VOTable: replaces (and deprecates) the COOSYS convention

STC-VOTable: current status

IVOA Note ``Referencing STC in VOTable''

- preliminary version in September 2007
- Version 1.01 in October 2008 *(few comments only!)*
- Version 1.02 (expected to be the final one) at the end of this meeting.

How it works:

2 definitions are required (STC nomenclature):

- the coordinate system = AstroCoordSystem
- the coordinates components = AstroCoord

but STC-Lib supplies *standard names* for commonly used space-time frames

More generic CooSys and Coords may be used for non-astronomical coordinate frame.

Not so complex !

- *For standard reference frames*: replace the COOSYS by a group having the 'right' utype and the right name as known in the STC-lib
- *For non-standard frames:* was not possible with the COOSYS ; becomes possible with the STC-relation paradigm

```
<COOSYS ID="J2000" equinox="J2000."
epoch="J2000." system="eq_FK5"/>
```

is replaced by

```
<GROUP ID="J2000" utype="stc:AstroCoords" >
  <PARAM datatype="char" arraysize="*"
      utype="stc:AstroCoords.coord_system_id"
      value="UTC-FK5-TOPO" />
</GROUP>
```

Note: named coord_sys_id in older STC documents

```
<GROUP ID="J2000" utype="stc:AstroCoords" >
   <PARAM datatype="char" arraysize="*"
       utype="stc:AstroCoords.coord_system_id"
       value="UTC-FK5-TOPO" />
</GROUP>
```

```
<FIELD name="RA" ref="J2000"
  datatype="double" ucd="pos.eq.ra"
utype="stc:AstroCoords.Position2D.Value2.C1" />

<FIELD name="Dec" ref="J2000"
  datatype="double" ucd="pos.eq.dec"
utype="stc:AstroCoords.Position2D.Value2.C2" />
```

Non-standard Coordinates

2 groups + Fields

- *coordinate system* group with attributes
  - utype=”stc:AstroCoordSystem” *(or CoordSys)*
  - ID=”mySysID” for referencing
- *coordinate* group
  - utype=”stc:AstroCoords” *(or Coords)*
  - ref=”mySysID” refers the *coordinate system* group
  - ID=”myCoords” for referencing
- Fields with *coordinate components* have the attribute
  - ref=”myCoords”

Coordinate components

Defined in FIELD with attributes:

- ref=”myCoords”
- utype=”stc:AstroCoords.*type*.*rep*.*comp*”
  - *type* = Position2D | Position3D | Time
  - *rep* = Value2 | Value3 | TimeInstant
  - *comp* = C1 | C2 | C3 | ISOTime | MJDTime

Examples

- Example 1: List of observations expressed in UTC-ICRS-TOPO
- http://ivoa.net/Documents/Notes/VOTableSTC/VOTableSTC-20081018.html#example1
- Example 2: except of the Hipparcos Catalog
- http://ivoa.net/Documents/Notes/VOTableSTC/VOTableSTC-20081018.html#example2
- Example 3: Ephemerid of a comet
- http://ivoa.net/Documents/Notes/VOTableSTC/VOTableSTC-20081018.html#example3

VOTable 1.2

Ready for starting the IVOA Recommendation procedure. Changes from V1.1:

- COOSYS deprecated in favor of GROUP/utype
- generalisation of the INFO tag
- Some naming conventions for the relations between tables (primaryKey / foreignKey)
- recommended Mime type:

application/x-votable+xml

Primary / foreign key

```
<TABLE ID=”Catalog”>
 <GROUP ID=”PK1”
   name="primaryKey">
  <FIELDref ref="Cluster">
  <FIELDref ref="Galaxy">
 </GROUP>
...
 <FIELD ID="Cluster" .../>
 <FIELD ID="Galaxy" .../>
```

```
<TABLE ID=”Obs”>
 <GROUP ref=”PK1”
   name="foreignKey">
  <FIELDref ref="Cl">
  <FIELDref ref="Gal">
 </GROUP>
 ...
<FIELD ID="Cl" .../>
<FIELD ID="Gal" .../>
```

VOTable1.2 Recommendation

- Document ready -- please have a look and comment (VOTable list)
- XML-Schema available since >1yr, did not hear of any problem
- Reference implementation ?
  - VizieR results in VOTable1.2 within weeks
  - TOPcat ?
  - VOPlot ?
  - CONVOT ?

Future of VOTable

After VOTable 1.2

- To keep as a Working Group ?
- Need maintenance ? Volunteers ?