1. STC in VOTable

Markus Demleitner (msdemlei@ari.uni-heidelberg.de)

Current state: Ochsenbein, McDowell, Rots, IVOA Note, 2009-06-12: Serialization using utypes; system definition in a group with utype AstroCoordSystem, column binding in a group with utype AstroCoords.

This talk: some suggestions for streamlining, RFC.

And, by the way, the STC library I would otherwise have talked about – see http://vo.ari.uni-heidelberg.de/soft

2. The AstroCoordSystem group

   <GROUP utype="stc:AstroCoordSystem" ID="HIP" >
   
   <GROUP utype="stc:AstroCoordSystem.TimeFrame" >
   
   <PARAM name="TimeScale" datatype="char" arraysize="*"
   utype="stc:AstroCoordSystem.TimeFrame.TimeScale"
   value="TT" />
   
   [...]
   
   </GROUP>
   
   <GROUP utype="stc:AstroCoordSystem.SpaceFrame" >
   
   <PARAM name="CooFrame" datatype="char" arraysize="*"
   utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame"
   value="ICRS" />
   
   [...]
   
   – the utype/value pairs can be inferred from STC-X with a little effort. Additional hierarchy by grouping utypes belonging to the various frames.

3. The AstroCoord group

   <GROUP ID="HIPcoo" utype="stc:AstroCoords" ref="HIP">
   
   <PARAM name="Jepoch" datatype="double" unit="yr"
   utype="stc:AstroCoords.Position.Epoch"
   value="1991.25" />
   
   <PARAM name="epochScale" datatype="char" value="J"
   utype="stc:AstroCoords.Position.Epoch.Scale" />
   
   <FIELDref ref="pm2"/>
   
   [...]
   
   </GROUP>
   
   – additional key-value pairs, a ref to the coordinate system, and id for column referencing and, optionally, references to the fields.
4. FIELD definitions

```xml
<FIELD name="RA(ICRS)" ucd="pos.eq.ra;meta.main"
    ref="HIPcoo" ID="RA1" datatype="double" unit="deg"
    utype="stc:AstroCoords.Position2D.Value2.C1">
</FIELD>
```

- utypes directly inferrable from an STC-X representation, reference to the AstroCoord group.

5. Change 1: Reverse References

Instead of having utype and ref on FIELD, put groups into the AstroCoords group:

```xml
<GROUP ID="lltoush_coo" ref="lltoush"
    utype="stc:AstroCoords">
<GROUP ref="alpha"
    utype="stc:AstroCoords.Position2D.Value2.C1" />
<GROUP ref="rv"
    utype="stc:AstroCoords.Redshift.Value" />
</GROUP>
```

- Keep STC information confined to STC groups (helps libraries)
- Don’t clobber utype and ref on FIELDs to preserve them for other, less generic purposes

6. Change 2: Flat systems

Just have all utype/value params as direct children of the AstroCoordSystem group:

```xml
<GROUP ID="lltoush" utype="stc:AstroCoordSystem">
<PARAM arraysize="*" datatype="char" value="VELOCITY"
    utype="stc:AstroCoordSystem.RedshiftFrame.value_type" />
<PARAM arraysize="*" datatype="char" value="ICRS"
    utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame" />
</GROUP>
```

- Flat is better than nested (try python -c 'import this').
- Additional groups add no information, probably don’t really help implementations or humans on parsing and complicate writing.

Though there still seems to be quite some disagreement about what utypes are supposed to be, a common motive seems to be “flattening of complex data models”. Let’s do that.

7. Change 3: stc: means package

Don’t pretend the stc: in the utype has anything to do with an XML namespace.

```xml
<VOTABLE version="1.2" xmlns:xsi="http://www.w3.org/2
xmlns="http://www.ivoa.net/xml/VOTable/v1.2">
```

- No xmlns:stc attribute here to avoid misconceptions
- Reinforce the notion that the value of the utype attribute is an opaque string (from a machine’s point of view)
8. Change 4: Only allow string values

Define that all STC PARAMs are datatype= "char" arraysize="*".

- We have no real serialization rules for anything but strings for the PARAM’s value attribute, do we?
- Provides the easiest way to unambiguously define the utype serialization by pointing to the STC-X schema
- Otherwise, libraries have to keep a mapping from “known utypes” to their types; possible, but not nice.

While we are at it: We should add some language on forbidden stc utypes in VOTables (most notably, unit).

9. What next?

- Tell me what you think.
- With sufficient encouragement, I’ll try to prepare a new version of the Note.
- With even more encouragement, I might write an XSLT that could formally define the whole scheme based on STC-X
- I can quickly whip up an implementation of this scheme, sans any changes you detest.
- At least the reference reversal should definitely be done, or we’ll suffer forever by effectively invalidating FIELD’s utypes for domain data models.