SAS Calibration Infrastructure

What it is, what it does

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Data

- Calibration information itself
  - Provide access to calibrations **needed for data analysis**: dead/hot channels, gains, pedestals, other conversion factors …
  - So far all data are in XML files; some will be in ROOT later. SAS analysis software won't notice.
- Metadata
  - For each calibration file, make an entry in a database.
  - Columns describe
    - Type of calibration
    - Validity
    - Where to find it
    - …

Calibration data types

"done"
in progress
known, to do

CAL pedestals

CAL elec. gains

CAL mu slopes

CAL light asymmetry

CAL integral non-linearity

TKR hot, dead strips

ACD pedestals

ACD elec. gains

ACD efficiency

ACD threshold high

ACD threshold low

CAL light attenuation

CAL light yield

CAL differential non-linearity

CAL hot, dead channels

CAL discriminator LO

CAL discriminator HI

TKR TOT signal

TKR TOT count distribution

TKR MIP efficiency

This list is negotiable.

Data example extract

Can also be "**hot**"

```
<badStrips badType= "dead">
   <generic instrument="EM" timestamp="2003-11-7-18:00" calType="TkrBadStrips"
fmtVersion="v2r0" >
     <inputSample startTime="2003-10-1-00:00" stopTime="2003-12-1-00:00" triggers="physics"
       mode="normal" source="van der Graaf" >
       Output from BadStripsCalib, on run ebf031006235353
     </inputSample>
  </generic>
  <tower row="0" col="0">
     <uniplane tray="0" which="top" nOnbdData="true" allBad="true" />
     <uniplane tray="1" which="bot" nOnbdData="true" allBad="true" />
     <uniplane tray="1" which="top" nOnbdData="true" >
       <stripList strips= " 434 " />
     </uniplane>
     <uniplane tray="2" which="bot" nOnbdData="true" >
       <stripList strips= " 107 122 578 " />
       <stripSpan first= "0" last= "33" />
      …..
```

Use standard tower numbering scheme: LAT-TD-00035

Refers to Si strips on top of physical (hardware) tray.

Metadata columns (1 of 2)

(S) Search (R) Read data (I) Info

Field name	Who fills	Explanation, typical contents
ser_no (S)	Mysql (rdbms)	Unique serial # for this record
calib_type (S)	Calibrator	TKR hot channel, CAL light asymm….
flavor (S)	Calibrator	String for application use; defaults to "vanilla"
data_ident (R)	Calibrator	Typically file spec.
vstart (S)	Calibrator	Start of data-taking interval to which calibration applies
vend (S)	Calibrator	End of data-taking interval to which calibration applies
enter_time (I)	Mysql (rdbms)	Time entry was made in database
instrument (S)	Calibrator	LAT, EM,…
data_fmt (R)	Calibrator	For now only XML supported; someday also ROOT
fmt_version (R)	Calibrator	Intent is to supply enough info. so that programs may determine if they are able to read the data
locale (I)	Calibrator	Where calibration was done

Metadata columns (2 of 2)

(S) Search (R) Read data (I) Info

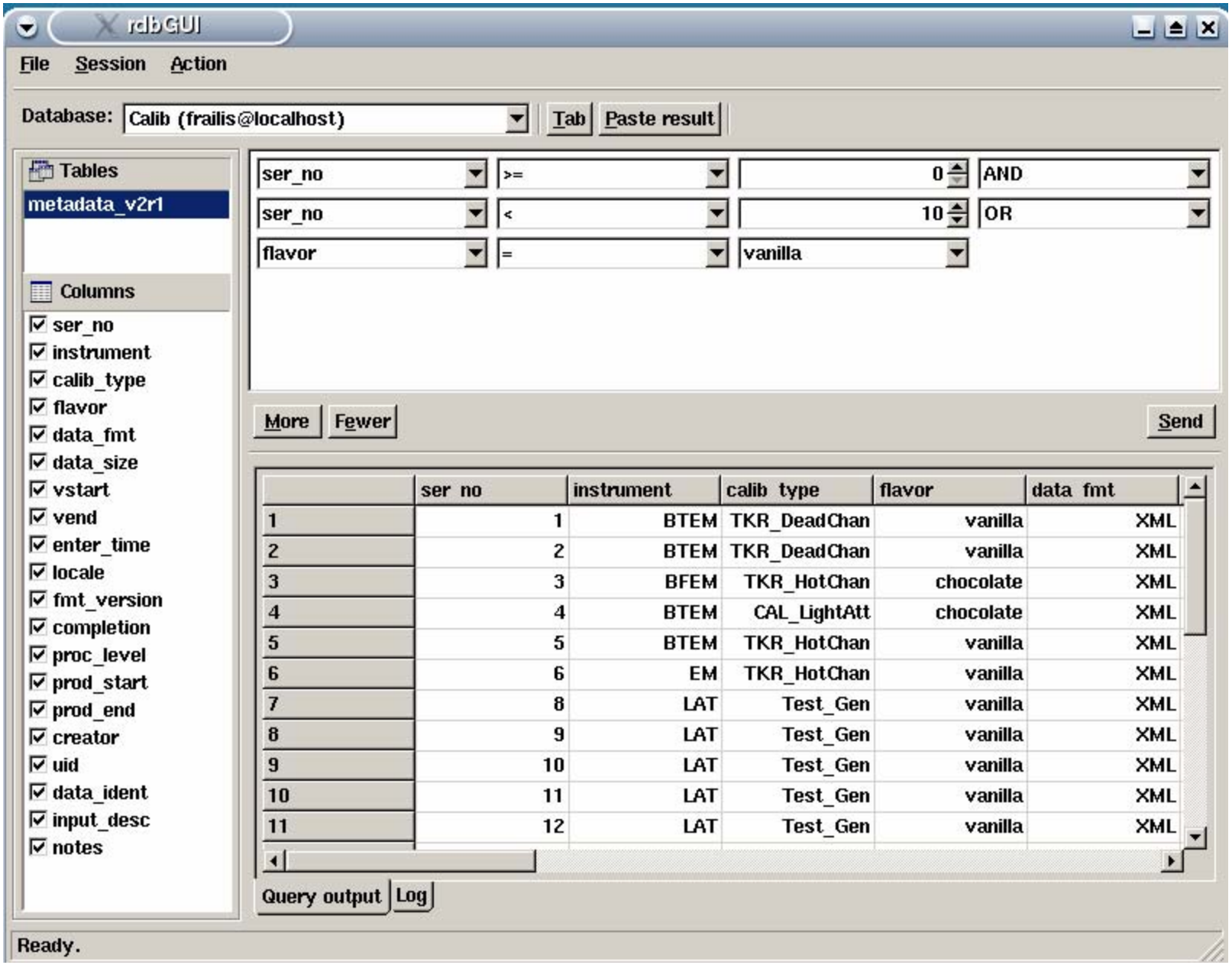
Field name	Who fills	Explanation, typical contents
completion (S)	Calibrator	Did procedure complete? 'OK', 'INC', 'ABORT'
proc_level (S)	Calibrator, Maintainer	Quality? 'PROD','DEV','TEST','SUPSED'
creator (I)	prog (e.g. rdbGui)	Name of program or script creating entry
uid (I)	prog (e.g. rdbGui)	Id, e.g. login id, of person invoking program
data_size (I)	prog?	So far unused
prod_start (I)	Maintainer?	Timestamp for when calib. was declared 'PROD'. So far unused.
prod_end (I)	Maintainer?	Timestamp for when calib was declared 'SUPSED'. So far unused.
input_desc (I) *	Calibrator	English description of input data.
notes (I) *	Calibrator	Anything else about calibration or conditions under which it was performed that might be of interest.

* May want to formalize configuration in one or more additional columns

Software

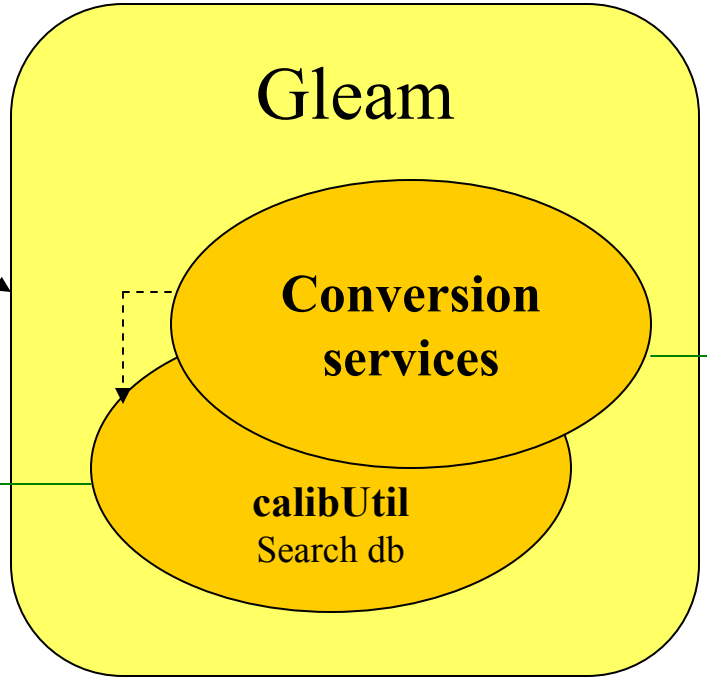
- Data access for SAS via Gleam
  - Search metadata dbs for "correct" calib for active event
    - Alternate diagnostic mode: ask for calibration by enter_time
  - Read data into memory (conversion service)
- Stand-alone (no Gleam, no Gaudi) metadata access via rdbGui – thanks to Riccardo & Marco
  - Browse
  - Insert entries for new calibrations
  - Update existing entries (to do)

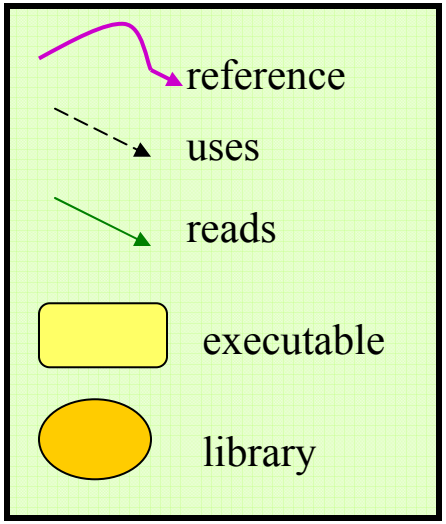
- Low-level tools
  - MySQL command-line program [Not recommended]
  - XML parser [Not recommended]
  - Interactive ROOT (for future ROOT data) [probably ok]

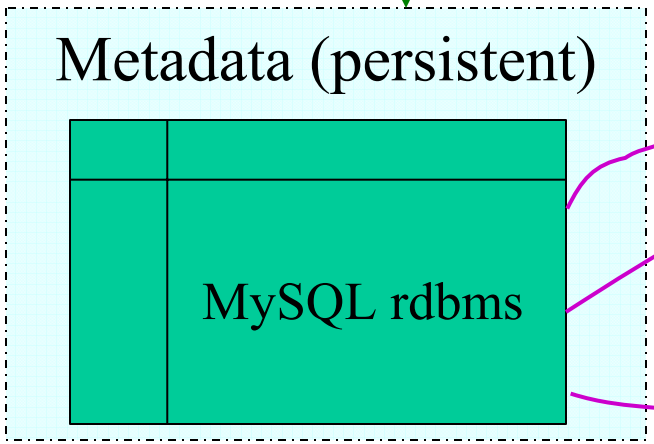


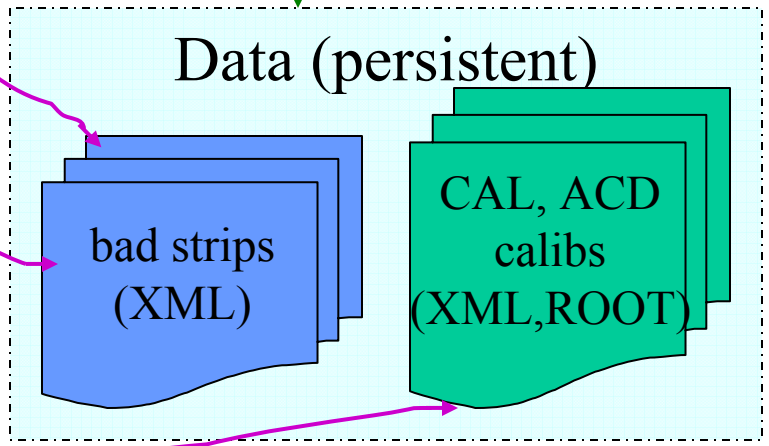
	ser_no	instrument	calib_type	flavor	data_fmt
1	1	BTEM	TKR_DeadChan	vanilla	XML
2	2	BTEM	TKR_DeadChan	vanilla	XML
3	3	BFEM	TKR_HotChan	chocolate	XML
4	4	BTEM	CAL_LightAtt	chocolate	XML
5	5	BTEM	TKR_HotChan	vanilla	XML
6	6	EM	TKR_HotChan	vanilla	XML
7	8	LAT	Test_Gen	vanilla	XML
8	9	LAT	Test_Gen	vanilla	XML
9	10	LAT	Test_Gen	vanilla	XML
10	11	LAT	Test_Gen	vanilla	XML
11	12	LAT	Test_Gen	vanilla	XML

SAS user


Gleam
Conversion services
calibUtil
Search db


reference
uses
reads
executable
library


Metadata (persistent)
MySQL rdbms


Data (persistent)
bad strips (XML)
CAL, ACD calibs (XML,ROOT)

Calibrator

reference

uses

reads

writes to

program, script

rdbGui

Register, search

ROOT macros, etc.

Data (persistent)

bad strips (XML)

CAL, ACD calibs (XML,ROOT)

Metadata (persistent)

MySQL rdbms

Status and Plans

- All major pieces exist…
  - Mysql dbs, data formats
  - Gleam conversion services to select and read calibs
  - rdbGui (close to alpha release)
- System is flexible - had better be! To come:
  - converters for many more calibration types
  - (maybe) additions to Mysql table structure
  - use true event timestamp (currently fake it)
  - conversion services, file formats for ROOT
  - maybe consider alternate data storage options for improved efficiency, robustness

References

- See the SAS Calibration Infrastructure home page, http://www-glast.slac.stanford.edu/software/calib/ , for links to several documents written over the last couple years, mostly on system design, e.g., "detailed notes (v2)" link http://www.slac.stanford.edu/exp/glast/ground/software/calibration/notes/calib-gaudi_v2.shtml It's essentially accurate except for status, to-do sections, and probably much more than you want to know.

- For the I&T perspective, see Eduardo's page http://www-glast.slac.stanford.edu/IntegrationTest/SVAC/default.htm