LCG Applications Area Meeting - 5 Feb 2003

ATLAS Strategy for the Data Dictionary & Persistency

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Background

- Following CSG decision in Nov 2002 to terminate the ADL project we needed to develop an alternative strategy and workplan
- Tentative plan proposed at that time was to use LCG Dictionary in conjunction with parsing C++ header files
  - Already being investigated by CMS
- Needed to understand options and timescales to see whether short-term interim solutions needed
- Ad hoc working group setup
  - Christian Arnault, Paolo Calafiura, Julius Hrivnac, David Malon, David Quarrie, Srini Rajagopalan, RD Schaffer, Craig Tull

Timecales

- Release 7.0.0 (June 2003)
  - Full persistency available
  - Reworked Event Data Model
- Athens Workshop (May 2003)
  - Stated desire to have “some” persistency available
  - Working backwards, that implies end of March

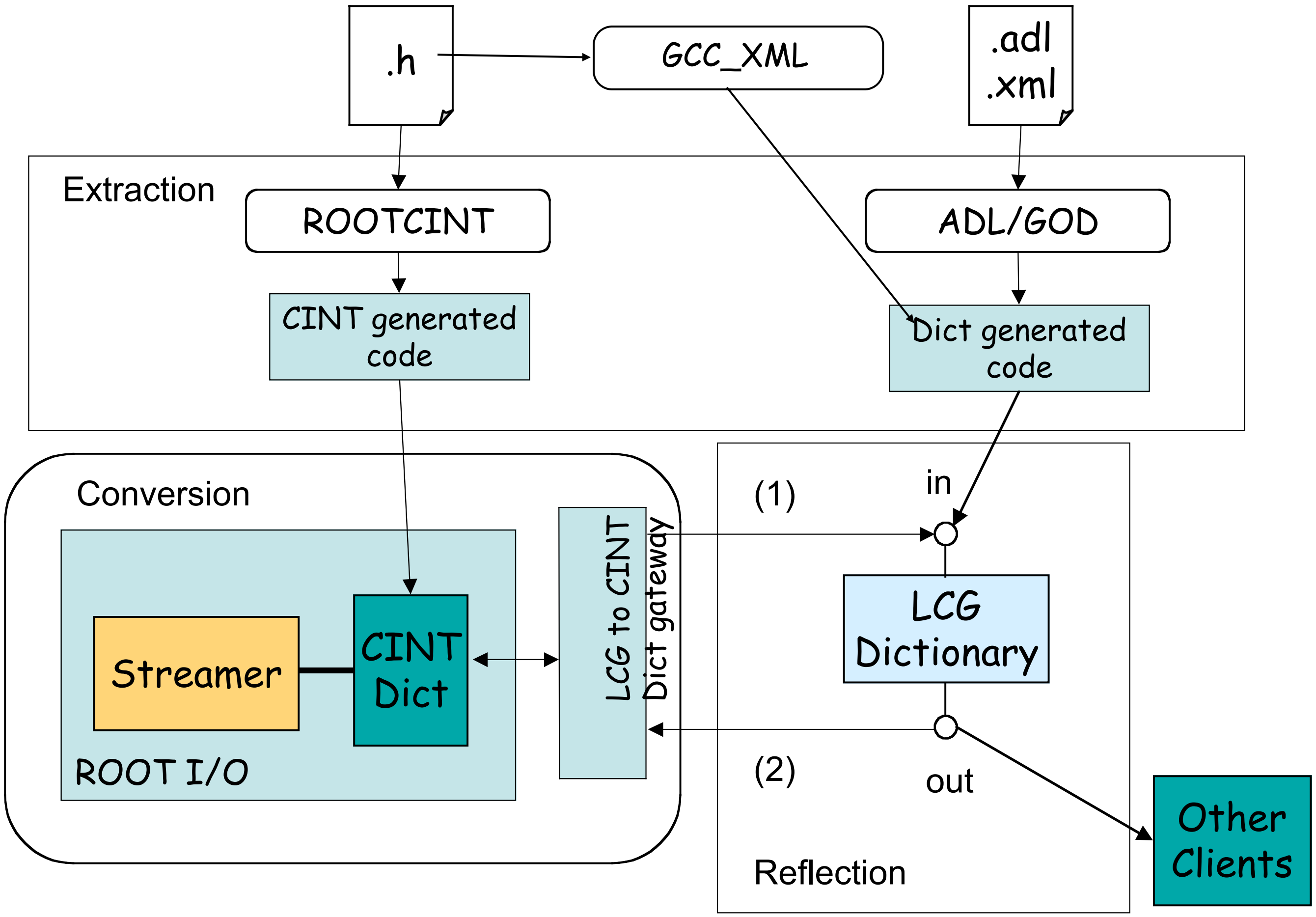
Possible Implementation Strategies

- Extend AthenaROOT to add generic ROOTCINT support
  - Extends our current short-term persistency solution
  - An interim solution only
- Use POOL persistency but use ROOTCINT to parse C++ header files (i.e. bypass LCG Data Dictionary)
  - ROOT now supports parsing of "foreign" classes
  - Seen as an interim solution only
  - Packaged as much as possible like the final long-term solution
- Use POOL persistency & LCG Data Dictionary in combination with parsing C++ header files
  - Final long-term solution

Extend AthenaROOT

- Currently converters are hand-written
- Original intention was to have ADL generate them
- Could use ROOTCINT parsing of C++ header files in conjunction with a single generic converter
- Seen as a totally throw-away solution
  - None of the development would be applicable to the final desired long term solution
- **Solution rejected**

LCG Data Dictionary



Use GuineaEvent package as testbed

- Developed for ADL validation/testing
- Covers most of ATLAS requirements
  - IdentifiableContainer, STL containers, DataLink<T>, etc.
- Identify the problems with parsing of GuineaEvent header files by candidate parsers
  - ROOTCINT
  - Gcc_xml
  - Doxygen
  - JavaCC

GuineaEvent & ROOTCINT

- Problems with GaudiKernel/Kernel.h
  - Fails on a "long long" datatype
- Problems with CLHEP classes
  - Fails on HEPSTL::vector instead of std::vector
- Problems with Boost
  - Heavily templated classes
- Probably localizable to StoreGate classes
- ROOT team working on fixes to some of these
- Not a simple "out of the box" solution

GuineaEvent & gcc_xml

- Gcc_xml is an OpenSource project to provide a XML back-end to GCC
  - Small but growing community of users & developers
  - Requires gcc 3.x
- Prototype available in contrib. area of POOL from Zhen Xie (CMS)
- Ran GuineaEvent through gcc_xml
  - Successfully created XML for 220 (!) classes
  - Didn't go as far as loading the LCG Dictionary

GuineaEvent & Doxygen/JavaCC

- Doxygen
  - Can generate XML as well as HTML
  - Evaluation showed XML less suitable than gcc_xml for loading data dictionary
- JavaCC
  - Used for ADL project
  - Is a "compiler-compiler" that can cope with many grammars
  - Intended to try the GuineaEvent classes in conjunction with the C++ grammar
    - Didn't get to this

Summary of Parsers

- Problems with ROOTCINT parser
  - Concerns about using it for an interim solution
- Gcc_xml looks like the best XML generator
- Prototype LCG Data Dictionary code needed to be reworked
  - Orsay offered to do this
  - Timescale - a couple of weeks
- The situation looks good from the perspective of loading of the LCG Dictionary
  - Available by mid-Feb.

Data Dictionary coupling to POOL

- POOL 0.3 release in December 2002 had severe restrictions
  - Essentially full support for ROOT TObject classes
  - Otherwise simple, untemplated, classes with no pointers
- However, in talking to Torre, Dirk, Pere and Markus Frank it seems that good progress has been made in the interim
  - Foreign class support now includes std::vector, std::list
- Reasonable optimism for good coverage in Feb POOL release
- High optimism for full ATLAS capability in May POOL/SEAL release

Strategy Decision

- Aim for full long-term solution
  - POOL persistency with LCG Data Dictionary loaded by gcc_xml parser for C++ header files
- Identify several work areas
  - XML parser & LCG Data Dictionary Loader
    - Orsay (Christian et al.)
  - Athena Data Dictionary Service Integration
    - LBNL (Paolo et al.)
  - Athena POOL Conversion Service
    - BNL (David Adams et al.)
  - CMT pattern integration
    - SIT (Christian et al.)
  - POOL Integration
    - Try to augment effort with BNL people?

Other Work Areas

- Revisit Physics EDM
  - Task force being setup to revisit reconstruction/HLT Algorithm granularity and associated EDM
  - Goal is to incorporate design feedback for Release 7.0.0
- Document constrained set of C++ that will be supported by the ATLAS EDM
  - The GuineaEvent classes embody perhaps 90% of this
- Understand how to customize the dictionary (e.g. to indicate data members that should not be persistified)
  - Proposal to use XML "strategy" files
  - Still need to look into this in detail

Athens Workshop

- I still can't give a positive response to the request that there be "some persistency" support available in time for Athens
- When I asked Fabiola & David Rousseau whether "4 or 40 classes" were desired, the answer was 20-40
  - This is clearly not feasible using hand written AthenaROOT converters
- The POOL/LCG solution doesn't look like it'll be ready in time

Summary

- We now have a new strategy in place
  - Aim for full long-term solution
    - POOL persistency with LCG Data Dictionary loaded by gcc_xml parser for C++ header files
- We have identified work areas
- We'll revisit the strategy following Feb POOL release
- Inevitably some schedule slippage following ADL cancellation
- Goal is complete EDM support for Release 7.0.0
- Still unable to commit to satisfying request for Athens Workshop