Software workshop summary

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Atlas software workshop

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Atlas Computing Organisation

- System coordinators and task leaders, WG chairs → Computing Steering Group
- COB, not intended to be executive body
- National Board being set up
- Need for further action:
  - Architecture working group after ATF, chief architect
  - Some software activities (eg. graphics), tools, support, productions, ...
  - Body preparing technical decisions
- Planning needed for Atlas and for reviews

Physics groups requirements

- Use past experience
- Satisfactory detector and physics performance
- Simplicity, functionality
- More specific requirements:
  - Module 0 simulation with Geant4
  - Full access to G3 produced Zebra tapes
  - More communication with Graphics domain
  - Endorse Root as one interim analysis tool

Physics groups requirements (2)

- Potential contributions from physics groups:
  - requirements and verification
  - MC generators
  - detector simulation (fast simulation, G4)
  - reconstruction class definitions
  - reverse engineering of F77
  - event definition
  - detector description
  - calibration and alignment
  - trigger / EF requirements, event pre-selection

Architecture task force

- Aim: outline of proposed architecture (verbal/pictorial description, no code yet)
- Gaudi (LHCb architecture) as a model
- Focus so far on other groups' activities, now turning to own design
- Issues: data vs algorithms, transient vs persistent, event data model, use cases, flexibility wrt implementation languages, scripting, …
- Collaboration conceivable if significant overlap in design

Use cases

- First round provided by systems
- Leads to a list of requirements (plain English and few simple diagrams) and subsequently design which can be checked against use cases
- Problem domain is huge $\rightarrow$ decomposition
- Disciplined iterative procedure through use cases, requirements, design, implementation: good experience in Geant4

PASO

- Temporary stop-gap solution for C++ prototyping, based on getGraphicsEvent
- Data access, visualisation
- No scripting, no GUI, simple facility for parameters (data cards) coming soon
- Code cleaned and commented, user guide
- Guinea-pig application module: TRT_Rec
- “Linking problem” being studied

LBL activities

- Group of people working on control
- Studying various solutions on the market which differ significantly
- Common themes: components, data/algorithm separation, physical design considerations, …
- Try and take the best from all possible worlds!

Quality control group

- Aim: ensure good design, code, documentation
- Onion model for software: kernel one used by everybody, outer layers for specific user groups; different quality standards proposed
- Focus currently on coding rules, based on Spider. Applicability defined as function of importance of a role, and the role of the package. Strong encouragement during interim period for non-core software to follow the same rules
- Medium term: software process

Training

- Focus currently on OO/C++
- Training contact people (to be) nominated
- OOAD with C++ course: not fully booked
- C++ consultants available; UCO in bat. 40
- Training Web pages actively maintained
- Looking into Web-based training
- Recording of courses?

Tutorials

- Unified Modelling Language
  - Introduction into main diagrams in UML
  - Contrary to predecessors, UML does not pretend to be a methodology
- OO for dummies
  - Main promise is maintainability, not time-to-market, not re-use
  - Objects bring data and behaviour together
  - Inheritance vs composition
  - Implementation languages

TileCal pilot project

- Goal: Support analysis of 1999 test beam using OO technology
- Detector-centric data access, flexible calibration strategy
- Simple examples exist $\rightarrow$ repository
- Useful as test bed for new technologies (in particular data base), and for TileCal test beam analysis
- Next: G4 simulated data, other calo test beams

Repository and releases

- C++ part in repository steadily evolving
- End date for binaries and libraries on AIX (end 99?), HP-UX (end 2001 or earlier)
- Release every 2 weeks, nightly builds from the head - automatic notification of authors
- Production release suffering from lack of testing - commitments and documented procedures needed
- Problems with Geant4 release

Repository and releases (2)

- Releases both in debug and optimised mode?
- Test area to be frozen, then removed - depends on production release
- Shared libraries for CERNLIB
- SRT changes, long-term maintenance problem
- Forum needed to discuss (and decide on) these technical questions
- Package documentation $\rightarrow$ QC group

Tools

- ART: going on checking existing tools against requirements
- Code checkers being evaluated
- Together: 30 days trial license
- Atlas Computing Web: dynamic creation of headers, footers etc with CGI, unchanged user HTML files
- Other Web tools: tidy, Htdig, Linbot
- Content and structure of computing Web needs revision

Analysis packages

- Iris Explorer/HEPExplorer not accepted by experiments
- Propose to define abstract interfaces to key modules of the interactive analysis, and then to take the best of all worlds - LHC++, JAS, OpenScientist, Root(?)
- Very early prototype to be given out in Marseille, demonstrating command line interface of the tool

Root

- Hot topic since years...
- (temporary) adoption of ‘Paw-like’ part proposed by physics community; attractive features beyond Paw
  - learning tool for C++?
- Some serious concerns...
  - Prefer modular system of analysis tools
  - Against design principle of transparent access to whatever data set
- Disagreement on whether or not Root would have strong impacts on our architecture (firewall?)
  - If no impact, no problem; the inverse is debated

LCB workshop Marseille

Points from LCB meeting on 1-Sep-99:

- Attendance is ‘open’
- Registration will close 18 September.
- Programme covers many areas of interest
- We can send up to 6 people to COMPAQ ‘non-disclosure’ talk on high performance computing. Who might be interested???

WG reports: Graphics

- Still not recognised in organigrams
- Trying to find contact persons in systems and activities
- Ongoing work on Atlantis, Aravis, Persint
- XML proposed for all ASCII data exchange
- New design for graphics core/control

WG reports: Data base

- More summary discussion than summary report…
- Detector description: single source, need ASCII representation
- Data base: generic persistent/transient mapping, distributed development, schema evolution
- Event: data model, collections, query services, …
- Available: most digits together with detector description
- Next steps: event model, mapping to online

WG reports: Data base (2)

- Objectivity not looking too healthy in HEP
  - Star has given up, BaBar with significant problems
  - LCB asked experiments about their opinions on what RD45 should do, and what the LHC ‘risk-averse’ strategy should be
- Alternatives: Relational DB, Root I/O, home-grown OODBMS(?)
- Transient/persistent separation obviously very important

WG reports: Reconstruction

- Reports from Trigger/DAQ/EF, ID, muons, LAr, TileCal; all doing steps to design OO software
- Event definition urgent - first entities, then operations
- Atrecon required until fully functional replacement exists
- Paso considered attractive for development of ‘slices’
- Reading from combined N-tuples or RECB

WG report: WWCG

- Simulation tool exists (J. Legrand) modelling the options considered by Monarc
- Successfully validated, agreement between simulation and test bed working groups of Monarc
- Interested people should contact Krzysztof Sliwa

Other activities

- Monday, Friday afternoon meetings
  - Informal get-together to establish contacts with system software coordinators, task leaders, overall coordinators etc.
  - Monday meeting focused on planning and reviews
- Drink
  - Seems to have been much liked...

Personal observations

- 3rd workshop with large component on policy, organisation etc.
  - Hope that we can focus on technical issues in future
- Numerous people attending for the first time
- Large variety of opinions
  - Have participants all spoken the same language? Have they talked effectively to each other?

Desirables

- Yet more end users and representatives of physics and performance groups
- More participation, both actively and passively, of Trigger, DAQ and Event Filter
- Geant4 based simulation