Workshop summary

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Atlas Software Workshop

Berkeley, 13 May 2000

XML workshop

- Focused at detector description
- F. Olken: Insight into presence and future of XML standards and tools
- Report from April workshop at CERN
- Reports from LCD, Glast
- XML in context, XML in Atlas
- Similarities, differences, open questions across experiments

Physics: Introduction, Milestones

- MC: Interfacing generators
- Atlfast being re-designed and re-implemented
- Autumn 2000: run new Atlfast in new framework
- Physics validation of Geant4 most important
  - Formal collaboration of experiments with G4 team
  - Comparison of G3 vs G4
- Shower parametrisation?
- Reconstruction: as good as ATRECON by end 2000, full validation (incl. persistency) in 2001

Event generators

- Mostly imported into repository
- Maintenance problem
- HepMC as standard interface in Atlas (in HEP?), being considered by Geant4
- Integration into Athena ongoing
- Open issues: random number handling, decay MC, put into repository and releases

ATLFAST

- Requirements being studied
- Re-implementation into Athena ongoing
  - starting from Atlfast++ (Root version)
  - re-design in OO
  - Makers to become Algorithms in Athena communicating via TDS
- Aim to finish by 09/2000
- Additional functionality of Fortran version to be implemented later

G4 physics validation

- Validation efforts started
  - G4 vs G3, G4 vs test beam measurements
- Formal collaborations with G4 team being prepared
  - EM barrel, had barrel, had endcap and forward
- Spontaneous efforts in subsystems
  - All working on G4 implementations of their test beams
  - Problems reported to G4
- Meeting to organise validation 18/05 at CERN

Digits and hits from G3

- Digits almost complete (except for FCAL and MDC), being used (and debugged)
- Hits:
  - Classes and containers: Effort started, straightforward, 07/2000 finish date reasonable
  - Digitisation: To be organised in subsystems. Requirements largely driven by pile-up

Combined performance groups

- Muon reconstruction at L2
- B tagging at L2
- Primary vertex search
- OO projects ongoing for jet finding
- Awaiting volunteers for OO re-implementation:
  - Jet energy calibration
  - Tau jet identification
  - Et miss reconstruction

Data base

- Work plan: access to G3 data (via Athena), infrastructure for DB creation, det. description infrastructure, support for test beams
- Viability assessment of Atlas baseline choice
- Grid-related database work
- Identifier schemes for hits and digits
- Detector description, XML developments
- Objectivity infrastructure: schema evolution, build procedure

Architecture

- May milestone: basic functionality, not easily usable for more than simple tasks. Started from Gaudi, implemented all (but one) features
- USDP effort on use case driven design ongoing in parallel, merge later this year
- Next: transient event store, particle properties, event data model (workshop on 31/05/2000), scripting, on-demand sequencing, documentation, QA, review
- Next milestone: September 2000

General news, status

- Some key people left
- Simulation coordinator (KA), chief architect (DQ) nominated
- CSG discussing plan
- Fortran90 question
- Software Agreements and Computing MOU being discussed and prepared

Atlantis

- Can read more than one event now!
- Methods to sensibly display (= help to recognise patterns) densely populated regions
  - V-plot
  - Filters based on density distributions
- Calorimeters and muon detectors to come
- Re-implementation in Java in progress

Atlas Computing PLAN

- Motivation: for others and for us
- Status: Snapshot publicly available
  - Probably containing inconsistencies and mistakes, not complete yet
  - Dependencies, resources, … to be put in
- Mainly driven by dates for MDC 0/1/2, TDR, MOU
- Major cycles finishing end 2001 and end 2003
- Plea for help to enter data and follow up

Technical group issues

- Repository policy confirmed, document updated (check-in and private tags vs release tags)
- Platforms: no more AIX, Linux 2.0/RH5.1, HP and Compaq under discussion
- First cvs/SRT based production release
- Release tools: maintenance problem
- Other: documentation, Java support, naming conventions, garbage collections, setup scripts, exception handling

Simulation (1)

- Reports from systems: Geometry in G4 is an issue (memory and/or CPU). Detailed tests of G4 ongoing, revealing good agreement in some areas, some problems in physics processes
- Communication with G4 to be improved (read access to CVS, fast release of bug fixes, …)
- Work plan for changing G3 geometry: two steps
- Requirements of Trigger/DAQ

Simulation (2)

- Future activities
  - Full simulation framework
  - Integration of subsystems
  - G4 physics and geometry validation
- Responsibility issues to be sorted out (detector description)
- Regular meetings and workshops

Test beam software and support

- Requirements: efficient data storage, fast data analysis. Short-term (for detector development) and long-term (for calibration) data life time
- Need for calibration / run conditions DB infrastructure
- Impact on work of database group
- Missing: Persistent I/O, detector-centric mapping, detector datastore, bookkeeping
- (Very) tight timescale

NCB, EU grid bid

- NCB mandate and organisation, working groups
- Planning for definition of Regional Centres
- Bid sent in for an EU grid project, aimed at efficient analysis of data in large-scale distributed databases
  - Collaboration envisaged with US projects
  - Work packages defined
  - Bid together with biologists and earth scientists

EU grid bid (2)

- Milestones in sync with Atlas plans(?)
- Will take lots of resources from Atlas, need to ensure that Atlas needs are taken into account properly
- Efficient communication and reporting channels to be established

Grids and world-wide computing

- What implications does distributed computing have on the Atlas software?
  - Data base
  - Framework
- Do sizing estimates (of CTP) remain correct?
- Stringent tests in 2002, hence need large portion of grid software in 2001!
- Structure required to organise coupling of grid activities and software development

Monarc simulations

- Results:
  - 622 Mb/s links required between T0 and each T1, and probably between T1 and each T2
  - Results assume an object oriented data base providing a uniform logical view of data

GriPhyN

- Proposal submitted in April
- Research areas: data catalogs, transparent caching, automated data handling, resource planning, execution management, security
- Schedule similar to EU grid bid
- Coherent effort needed to understand how Atlas interacts best with grid efforts: workshop at Indiana 16/17 June

Particle Physics Data Grid

- Addresses long-term data management needs of HENP
- Research areas: network and middleware infrastructure
- Iterative process of deployment, tests and demonstrations, development of architecture and tools
- Atlas heavily involved, using MC and TileCal testbeam data

Reconstruction (1)

- Geometry changes in Atrecon, OO reconstruction as good as Atrecon end 2000, full functionality end 2001
- Trigger software: Fortran stable, new OO implementations, requirements on framework
- LAr OO: going ahead, fairly painless integration into Athena
- TileCal OO effort launched
- Lot of work ongoing on muon identification

Reconstruction (2)

- Muonbox wrapping: essentially done, suffering from problem with RPC digits, and from missing TGC digits
- Amber used as starting point for muon OO reconstruction
- xKalman++ ported to Athena - early adopter's experience. Code to be made more modular. Conversion of identifiers from Age most difficult part

Graphics

- Two big themes: Java, XML
- Graphics framework in Java exists already
- Aravis remains in C++, Motif $\rightarrow$ Qt
- Data in mixed shape, system/combined performance group help required
- GraXML industry standard, used to display geometry, hits, tracks…
- JAS: new release soon, impressive feature set, plug-in facilities
- Java performance for graphics

CERN LHC computing review

- Launched September 1999, report due by summer 2000
- Steering committee, three technical panels, all with Atlas representation
- Software panel (Kasemann) very active, extensive list of questions and discussion items
- Communication with IT being addressed
- Discussions about 2003 MDC

Tools

- XML for documentation: slow progress, not mature yet
- Code checking: Code wizard soon, Together?
- Together doing well as design tool
- Java: C++ access to Java objects via JNI very convenient. Proposal to think about Java compliance for further Athena evolution
- Release tool: hot topic… trying to go ahead evaluating candidate tools

Computing platforms

- Platforms available at CERN: suggestion to stop access to Digital and public HP by end 2000
  - Implications on Atlas HP boxes at CERN
  - Nobody seems to be ***very*** unhappy
- Support of Atlas software: drop Digital, HP support by the same time?

Observations

- First outside workshop since August 1998
- Remarkable coherence; lots of discussions, all centred around how to move forward technically
- Major contribution: Progress on framework by A-team
  - They demonstrated that one can achieve something if one decides to go for it

Framework tutorial

- Ambitious milestones of A-team
  - Must: read physics TDR data, multiple user modules, read from / write to transient event
  - Should: Generate ED, dynamic module loading, sequences with branches/filters
  - May: rudimentary interactive interface, HBOOK persistency
- Almost all met, including all “must”
- Apart from meeting the milestone, A-team has prepared a convincing tutorial… and the Berkeley guys have organised this workshop!

Observations (2)

- Special thanks to Craig Tull, Roberta Boucher and all those who have helped them organising this very successful, enjoyable workshop

Future workshops

- At the limit of what can be achieved with the usual organisation - time for a change
- Having organised 13 workshops, asked for a replacement
- Always more fun than anything else
- Thanks to all of you… for having supported me that well!