Software Status

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http://www.hep.ph.qmul.ac.uk/∼landon/talks

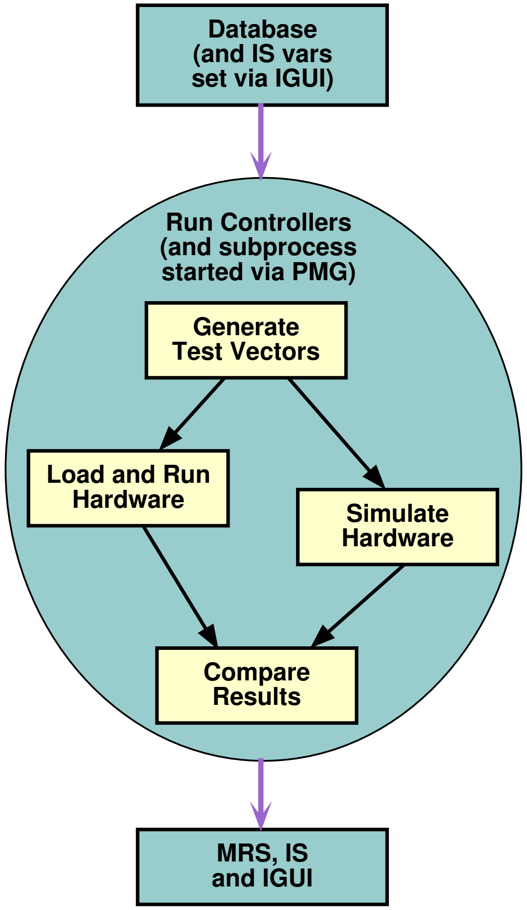
Overview

- Reminder of the aims
- Recent developments
- Whats missing
- Feedback and review?
- Tasks and timescales (as at Mainz and now)
- Meetings, visits and people

Reminder of the Aims

Slice Test Procedure

- Choose a test to run and a hardware configuration
- Generate test vectors (if necessary)
- Load the hardware with test vectors
- Simulate expected output of the selected configuration
- Run the system, collect data, compare and report



Recent Developments: Overview

Since the Mainz meeting

- For CPM, JEM and CPROD the module services are fairly mature. The focus has been more on using existing software than on new developments (though there have been many improvements and extra test programs)
- JEM simulation is nearly ready which will help JEM tests with other modules
- CMM module services and simulation have both been updated and extended
- PPM simulation is progressing
- An event dump utility is under development: CPM and JEM slice data formats are available
- Simulation framework improved, eg to add multislice readout
- Migration to new/different OS, gcc, Online, Dataflow and Qt software versions and distribution of prepared systems with network booting support
- Migration of HDMC into CMT and (some) database integration

Recent Developments: HDMC (1)

Move into CMT

- We have been meaning to do this for ages. But it was never the right time and seemed like some work...
- Recent OS/compiler changes caused problems with separate HDMC build (easy to get different compilers and libraries) consuming more time to diagnose and fix than the HDMC migration to CMT eventually took
- Original HDMC now split into five CMT packages:
  - halBase: few really basic classes
  - halCore: major part of the “hardware access library” classes
  - halL1Calo: L1Calo specific hardware classes
  - hdmcCore: major part of the GUI classes
  - hdmcL1Calo: L1Calo specific GUI classes

Recent Developments: HDMC (2)

CMT related and other cleanups

- The five new HDMC packages use two other new packages: qtExternal and dfExternal which provide the interface to external Qt/qwt and Dataflow libraries
- The former hdmcExternal package is now obsolete
- After the initial split into CMT packages, some obsolete classes were removed and various other cleanups performed
- Old documentation still needs moving and updating...

Recent Developments: HDMC (3)

Other improvements

- Two new HDMC main programs were added:
  - allHdmc: “traditional” HDMC incorporating all module services libraries
  - dbhdmc: HDMC with interface to the Online/L1Calo database using same interface as the run control (see next slide)
- Updated DataSink part: can now dump memories to files
- New SlinkDataSink part: a DataSink specifically to find and save Slink packets from memories for reading with the event dump

Medium/long term future

- At the ROD Crate DAQ meeting (March) the issue of a general diagnostics package was raised...

Recent Developments: DaqModuleFactory

Integration of Run Control and Module Services use of HDMC

- Until recent the module services (including “kicker” programs) and the run controller used somewhat different approaches to loading the basic HDMC parts for modules
- Recently these approaches were merged into a new DaqModuleFactory class which is now used by the run controller, the CPROD test kicker and interactive HDMC programs
- Other “kicker” type programs could be converted in due course...
- The DaqModuleFactory can also set up suitable “NetBus” access to remote crates. This is now used in the interactive dbhdmc program

Incomplete Developments: TTC commands

Support for TTC commands in multistep runs

- Some multi (or single) step runs under run control will need TTC commands issued at certain state transitions
- Support added in the database and (untested) in TTCvi module services to support this
- Work is not complete and not yet tested

Short or long format commands?

- In discussions around this we realised that different modules expect either short or long format TTC broadcasts (which provide signals on different TTCrx pins)
- Might be good to standardise before final modules are produced? Is the CMM already final?

Recent Developments: Database

Multistep runs and calibrations

- Support for these has been in the database and run control for a while – but concentration on more basic tests means they havent been tried in practice yet

Database worries

- Preparing databases for new test configurations is non trivial
- Not easy to change setups very quickly
- Maybe need some better tools (scripts?) or think about database file organisation

Future Developments?

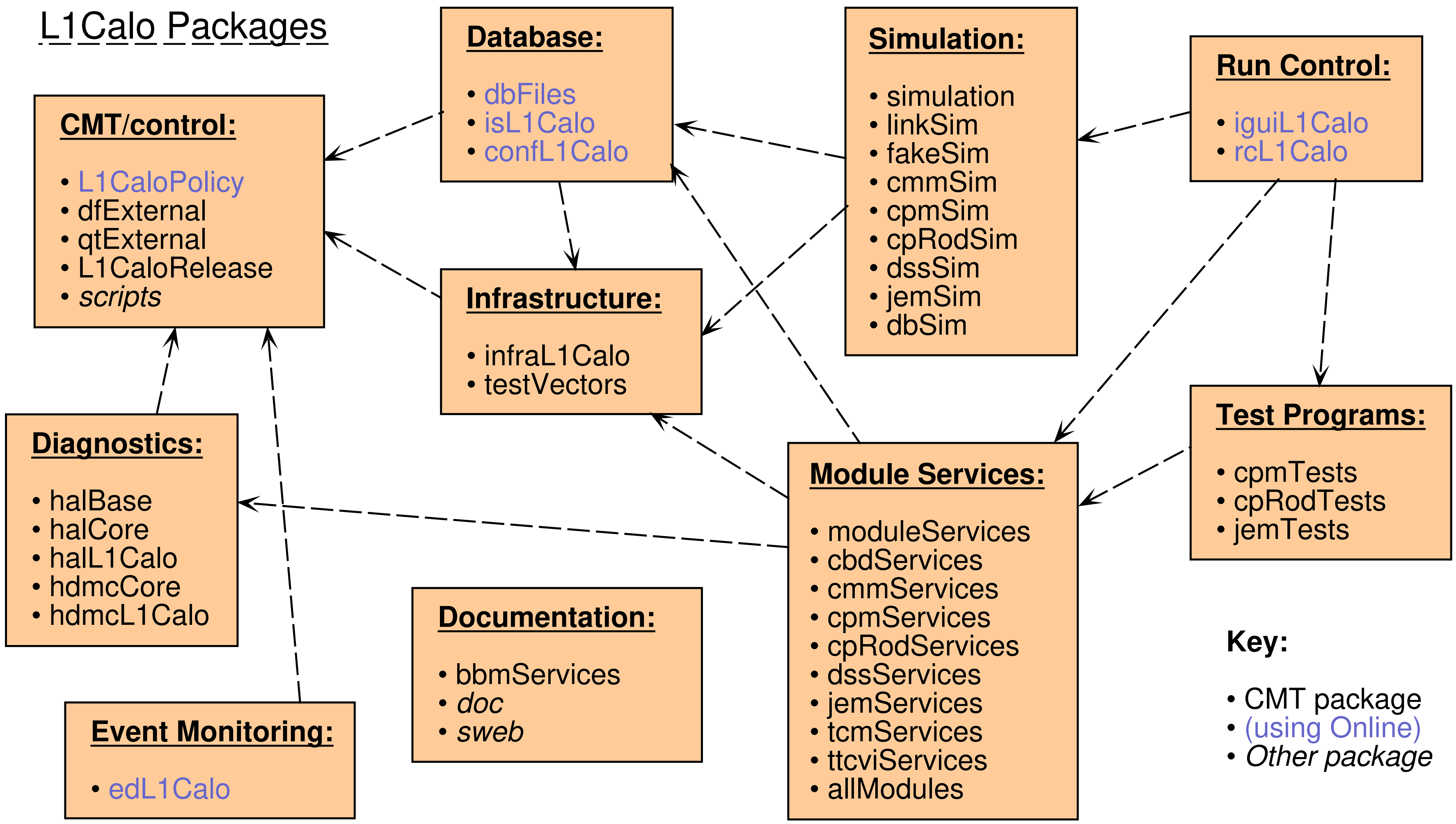
Forthcoming changes affecting database and run control

- The next major release of the Online software will support automatic generation of (some of) the presently all hand written (and very boring) database code. This could prompt (or be a useful occasion for) some significant changes?
- At some point also the Online run control will probably be changed significantly. In the mean time the ROD crate DAQ developments are proposing common style of run controller for all subdetectors. Again some significant changes may be in the pipeline...

Possible developments affecting module services

- ROD crate DAQ developments will also probably include a “generic module library” provide by the LAr software developers. If this becomes a standard and is suitable for us we may wish to evolve our module services towards it.

L1Calo Components and Packages



Whats missing? (1)

General framework

- Variable number of ROD inputs
- Use of L1A generation via DSS GIO card
- Timing (and other) multistep calibrations and test vector runs
- Use of the ROS and monitoring framework. This will soon(?) be crucial when reading more than one ROD
- Monitoring and analysis of events (eg better displays of data, deriving calibrations, summarising results of long tests with many test vectors, diagnosing faults)
- Better database tools?
- Record keeping (Online bookkeeper or even paper log books!)
- (and lets try not to forget about DCS)

Whats missing? (2)

CP subsystem

- Fairly good shape? More subslice integration tests (CPM,CMM,CPROD) (hopefully with more modules)

JEP subsystem

- Although run control integration is (mostly) ready, testing is mainly still with standalone programs
- Move to more run control style desirable with multicrate operation especially now JEM simulation is available (having a 9U crate at Mainz would probably help)
- Availability of all JEM CMM and CPROD firmware and software

Whats missing? (3)

PP subsystem

- Database: add PPM (esp calibration data)
- PPM module services: Asic/MCM test code developments should be a good starting point? But a lot more work is needed to enter this in the module services framework
- PPM simulation: more than one channel, readout, CMT integration
- ROD module services and simulation
- Test vectors: analogue pulses exist, what about digital data to check BCID, jet summing, etc?

What might be missing? (1)

Feedback required

- At the moment, the software is only used by software experts
- We want to get to a point where non software experts can do useful tests by themselves
- For this we need feedback on the (un)usability, (un)friendliness, (un)reliability, (un)documentedness, etc of the present software
- Developers of CPROD, CPM and JEM test setups should try to recruit non experts to spend a little time with the present (or soon to be completed) software and solicit their comments
- We also need to be told of the what requirements are as yet unfulfilled.

What might be missing? (2)

Review?

- We always intended to have a review of the software strategy and implementation “after the slice tests”
- But the amount of time we have after the slice tests but before we need “final” software is rapidly diminishing, so perhaps we should try to have a review sooner
- Opinions on this within the software group are divided
- A possible (but not agreed) timescale might include such a review in the autumn – perhaps depending on the nature of the feedback received

Progress since Mainz meeting (1)

Core and infrastructure: as proposed at Mainz

Activity	Duration	Date	Status Now
Test/debug new database features	1 week?	March?	Untested
Multistep runs with test vectors	1 week?	March?	Untested
Test and use L1A generation via DSS	2 weeks?	April?	Not done
“allModules” package	1 week?	March/April?	Done
System upgrades	2 weeks?	April????	Done
Use ROS (2 RODs)	1 month?	May??	Not done
Use monitoring framework	1 week?	May??	Not done
Report hardware status via the IGUI	1 week?	April?	Done

Summary now: some progress, but not with big items like ROS and monitoring.

Some things not mentioned, eg HDMC, event dump have seen useful progress

Progress since Mainz meeting (2)

CP/JEP Subsystems: as proposed at Mainz

Activity	Duration	Date	Status Now
CPM services and test programs	1 month?	April?	Done?
CMM services and test programs	1 month?	April?	Mostly done?
CMM simulation (inc JEP variants)	1 month?	May?	CP done?
JEM services and test programs	1 month?	April?	Done?
JEM simulation	2 months?	May/June??	Nearly done?
CP/JEP hardware monitoring to IS	1 month?	May?	Some?
CP/JEP calibration/monitoring	1 month?	June??	Not really
CP/JEP subslice tests	months?	July???	Started??

Summary now: good progress (given generous timescales)

Progress since Mainz meeting (3)

PP Subsystem: as proposed at Mainz

- Depends on availability of suitable person(s)...
  (able and willing to make a few working visits to the UK)
- Wait until Asic/MCM tests satisfactorily completed?

Activity	Duration	Date
PPM module services	2 months?	July?????
PPM simulation	2 months?	July?????
ROD simulation for PPM	1 month?	July?????

Summary now: July now seems very optimistic. Perhaps October? Also, given the learning curve, timescales are seriously underestimated

New Tasks and Timescales (1)

General

Activity	Duration	Date
Multistep runs with test vectors	1 week?	July?
Timing calibration runs	1 month?	July/August?
Test and use L1A generation via DSS	2 weeks?	July/August?
Use monitoring framework (via Kicker)	1 week?	July??
Use ROS (2 RODs)	1 month?	August??
Event dump (more formats?)		
Event analysis/monitoring		
Documentation...		

New Tasks and Timescales (2)

CP and JEP

Activity	Duration	Date
CP integration tests	1 month?	July/August?
CPM calib/test multistep runs	1 month?	August/September??
CMM simulation (inc JEP variants)	1 month?	July?
CMM calib/test multistep runs	1 month?	August/September??
JEM simulation	1 month?	July/August?
JEM tests via run control	2 weeks?	July/August?
JEP integration tests	1 month?	July/August?
JEM calib/test multistep runs	1 month?	August/September??
ROD firmware tests (JEM/CMM)	1 month?	July/August??

Meetings, Visits and People

Not enough?

- Sequential holidays of various people has made it hard to find dates for meetings which can include everyone
- Some very useful working visits, but not as many as hoped (hardware problems, not helped by software upheavals)

New additions

- Jürgen Thomas at QM until December

Still needed...

- Someone at Heidelberg...
- Working visit(s) to UK will be required. Visits by UK based software people to Heidelberg are also on offer, and Mainz expertise is nearby

Summary

Progress

- A lot of good progress...
- ...but still going slowly
  (sometimes due to hardware problems)

Worries

- Databases: preparation for various test configurations, calibrations, conditions database, etc
- DSS/ROD testing and reliability
- ROS, event monitoring, larger scale systems
- Hardware problems delaying integration tests
- DAQ software for the PPM