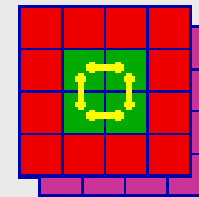# ATLAS Level-1 Calorimeter Trigger
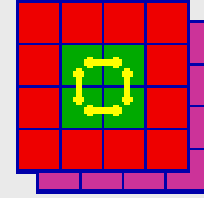
T/DAQ Week: An Overview
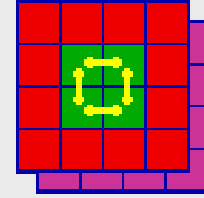
CERN: April 22-26, 2002

Bruce M. Barnett

Overview

- Introduction
- Dig
- DataFlow
- Global Issues
  - Partitioning (2)
  - How to define a run
- Online S/W Requirements
- ROS
- Prototypes
- Connect
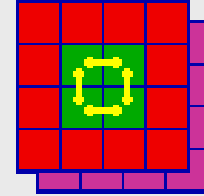- Miscellaneous
- The July Review

Introduction

- Atlas schedule. Although nothing is official about 2007 date yet, the anticipation is that a delay would delay HLT/DCS/DAQ by about 6 months, and that the additional amount (14 mo. Total) would be used to:
  - restore overall ATLAS tests with cosmics
  - delay HLT processing power purchase
- DC1 is late. Milestones (TDR) need to be resynchronized with the software development necessary. This shouldn't affect progress on the technical design.
- "Deferral Scenarios". 3 possible, with varying amounts of investment deferred - the affects on date rate being the second constraint. Likely scenario is partial deferral of funds resulting in an initial acquisition rate of around 50%.

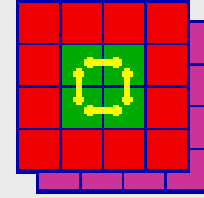B.M. Barnett, Rutherford Appleton Laboratory

Dig

- ROD Crate DAQ. Louis Tremblet. Essentially review as outlined by R. Spiwoks

- Event Format: A new version of ATLAS-DAQ-98-129 is available for comment. Feedback was requested.

- Dig Forum in June will likely bring the update of this document to a close.

- Dig Updates: Livio summarized last session
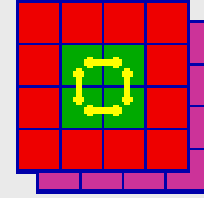
- Updates on dig training

DataFlow

- Long discussion of preprocessing, following on Pinfold's discussion of LAr compression schemes (based on dynamic selection of ADC and TDC readout, depending on ADC content). Data volume roughly halved.

- Should there be preprocessing in ROS? Probably not, except perhaps if the RODs provide an event containing dual fragments … one preprocessed and one not, then ROS could be designed to pass appropriate fragment (simple switch) to DataFlowManager.

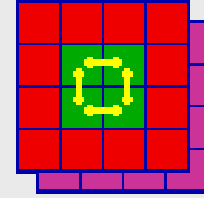- There might be implications for ROD design … but a little late!

Global Issues

- Several working groups are already in progress. These will continue their work to completion. A number of new working groups are being set up to deal with 'global issues' in addition. The model should be that:
  - Each working group has reps from various communities.
  - The wg's should clarify concepts and obtain a consistent view.
  - Reporting is to Dig, should be completed by June. (G. Monacci).
  - Individuals should feed comments to their rep on their (sub)system, and directly to the appropriate rep for other subsystems.
  - Reps should actively seek input from their (sub)system, and coordinate its inclusion in the work of the working group, keeping them informed of the progress of the group.
- L1 Online WG rep is M. Landon. L1 Global Issues WG rep is R. Spiwoks.

Partitioning (1/2)

- TTC clearly constrains the operational partitioning and cooperation of partitions in calibration.

- Ralf Spiwoks presented the level1 view. Discussed DCTPI module, which is meant to provide h/w mechanism to manage local/global trigger selection.

- The smallest TDAQ partition corresponds to a TTC partition, except not all partitions must have TTC. Level-2 might need to be segmented in other ways.

- The CTP needs input about the need for concurrent running of different partitions. Is there a reasonable request for a partitionable CTP? (Not currently anticipated.)

- Bob Blair noted that readout of some detector systems might need to proceed without level-1. Fred Wickens asserted that such stand-alone tests should probably be addressed via test pattern techniques.

Partitioning (2/2)
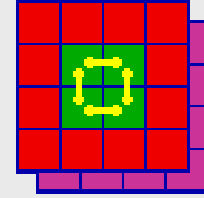
- DFM. There are issues concerning how to split and rejoin partitions coherently. This might correspond to a concept of 'soft' partitions.

- DCS. No intrinsic limitations having to do with partitioning. But central booking of resources is required.

- Online (Kolos) described s/w partitioning as it exists. He sees typical issues as:
  - How should other parts of TDAQ be partitioned.
  - When should partitions be altered.
  - How is the operational mode changed (calibration -> data taking.)
  - What if something goes wrong.
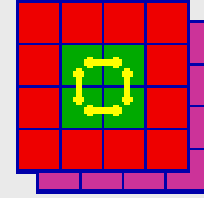 - What are the 'sensible' configurations.

What is a Run?
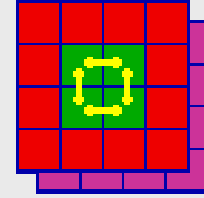
- This really was a discussion of how an operator perceives a run, vs how the s/w perceives it. Discussion really outlined the need to specify the requirements of what can change when, and how that is to be coordinated between systems.
  - What are the 'run types'
  - Must one propagate ALL information for a run when the state changes.
  - Stopping a run: how is this done. Are flushing events needed.
  - Is the event id sufficient to uniquely identify events.
  - How are dynamic changes to configuration made. Pause L1, allow flush, broadcast (time stamped) notification of configuration change to HLT. Pick up configuration when appropriate events arrive.
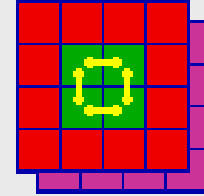
Online Requirements

- DataFlow perspectives to Online Requirements were presented by a number of members of that wg. Discussions included:
  - State model states/ state model.
  - Dynamic modification of subsystem states, independently of states other systems.
  - How to handle sub states.
  - The need for a 'step' state.

- Databases Luc Goosens. Antonio Amorim, Igor Solviev.
  - Objectivity dying. Discussion of how to move to RDB, and which one (Oracle, mySQL) … or both, where one is intended as institute-development implementation and the other as the solid CERN production implementation.
  - CMT: CMT version v1R12. Need for common policies. At moment there is an online and a dataflow policy. These should merge.
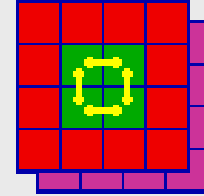 - Redhat. 7.2 is expected any day now. Common compiler …. gcc 2.95.2

ROS

- Discussion of URD.
  - This is well along. Discussion of TTC requirements in ROS. Is it needed and where and what is the cost. Do ROS requirements have to foresee all test setup requirements. Not if conflicting or if they result in sever design constraints. Timescales to complete. Draft 1.0 for middle may. Draft 2.0 for June. But: need better tools for incorporation and tracking of comments.

- Robin High level design.
  - FPGA PCI card designed in Mannheim. Dual bus/net interface to ROS. Cost target is 1000CHF per card. In collaboration with UCL and RHUL. Q4 2002 or Q1 2003.

- Progress with ROS high level design.
  - They use templates as provided by Doris. Coming along well. Comments by 30 April.

- Event format.
  - A working group is dealing with this. A common library will likely become available, so don't write your own if possible.
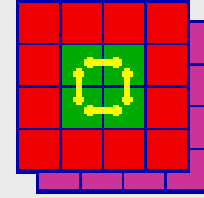
Prototypes

- Integrated Prototypes:
  - Functional tests … Phase 2A and 2B.
  - Remi: DC Note 031 presents his experience with online. Emphasizes that online isn't yet plug and play.
  - Giovana: ROS integration. A bit of a kludge, concerning online s/w which is by design not directly interfaced to the ROS side.

- Performance Test-beds:
  - Fred outlined plans for bringing this together. Explore foreseen as well as unforeseen problems. Investigate scaling issues, and others for presentation in TDR.
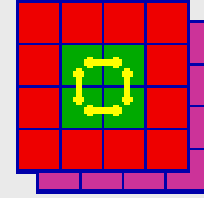
Connect

- Presented the Rational Unified Process (RUP). Std.cern.ch has document templates for URDs. CDS are available from STD free. Non CERN use would be 1000CHF.
  - RUP is view oriented.
    - Use Cases
    - Design View
    - Process View
    - Implementation View
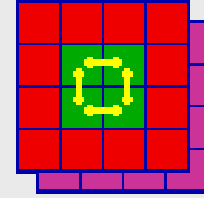   - Deployment View0
    - Data View.

Miscellaneous

- DCS TDR.
  - Some systems configure front ends with DCS, not DAQ. This breaks the model.
  - Recommendations:
    - Reactivate the par LHC data interchange WG.
    - Should be part of JCOP.
    - Some worry about JCOP's ability to provide deliverables.
- TTC
  - FDR (?) Review scheduled for 15 May.
- TDAQ Glossary
  - Should be started. Already there is confusion of language (partition, …)
- Integration Issues (Fred).
  - Discussed rack space in SDX and USA15 (theirs, not ours, I guess). (10 in usa15 for ROS / Patch-panels)
  - Provision of networking infrastructure

The July Review

- Discussion on the nature of the July review.
  - Should be an internal review of technical design. Although originally this was to be a review to be presented in TDR, there is now likely to be an additional review before that, with an anticipated delay in TDR due to the delay of DC1.
  - Should present top-down design.
  - Prototype results which serve to validate the design should be included.
  - Reviewers will be appointed. 10-12 from within TDAQ. None from outside ATLAS, but in the final review that will be the case. Perhaps TC or ASSO reps will be invited.
  - DCS should be included. Level-2 interfaces need to be included where relevant.
  - TDSG wants this to be a stepping stone in the design process.
  - DjF has circulated a view from the TDSG.