ATLAS@DESY meeting
26. April 2006
DESY

The Configuration System for the ATLAS Trigger

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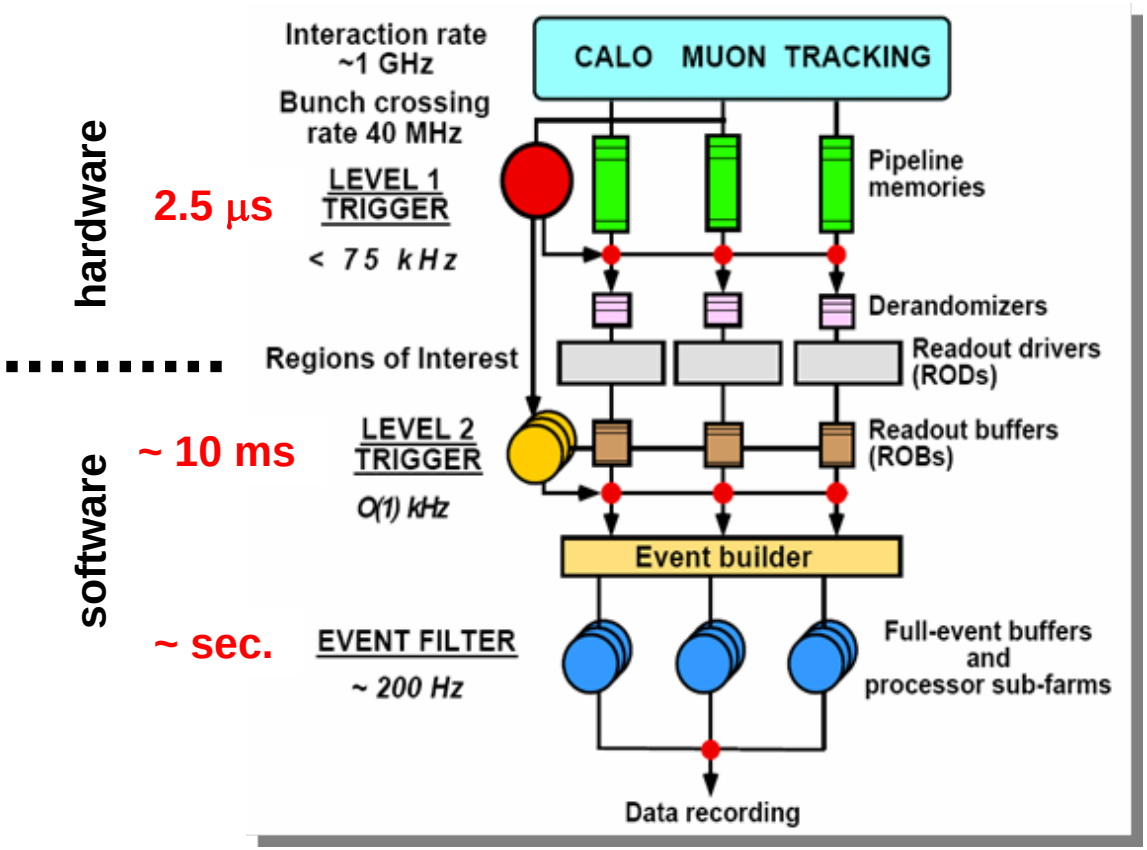
Reminder: The ATLAS Trigger System

ATLAS 3-Level Trigger System:



1) **LVL1** decision based on data from calorimeters and muon trigger chambers; synchronous at 40 MHz; bunch crossing identification

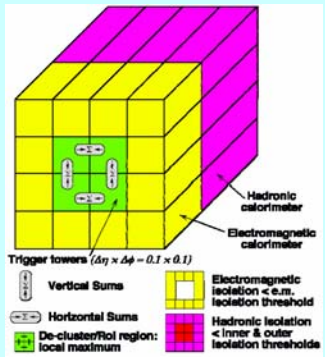
2) **LVL2** uses Regions of Interest (identified by LVL1) data (ca. 2%) with full granularity from all detectors

3) **Event Filter** has access to full event and can perform more refined event reconstruction

HLT runs offline SW Framework ATHENA

Online event Selection: Example Electron

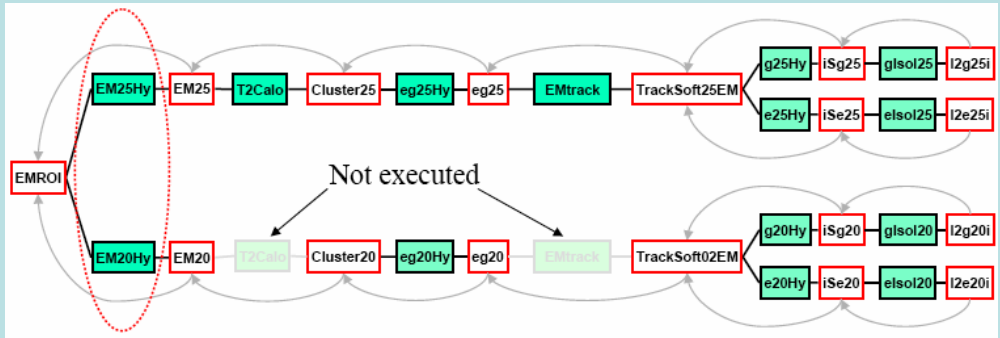
LVL1



L1Calo: RoIs

CTP: decision

HLT



algorithms (refinement of Trigger-elements/ RoI)

Steering (stepwise calling of algorithms, stepwise decisions, early reject)

Configuration:

LVL1 HW

Client: VME modules of L1Muon(RPC+TGC)/L1 Calo/CTP

~ 3000 HLT nodes

SW parameters (ATHENA)

algorithms

HLT menu (logic)

Steering

The task

Construct a system for the operation and configuration of the trigger that:

- is operable in normal conditions by the shift crew, while providing access to all details for the expert.
- must store all information to configure the online selection

  VME registers of LVL1, CTP LUT CAMs (logic), prescales, bit information for LVL1 subsystems, thresholds, full HLT selection, …
- needs compilers to produce HW files for LVL1 (LUT, CAMs)
- provides a record of the trigger conditions used
- can be used for online trigger and offline trigger simulation, in the pit on the Grid
- must scale with the final size of ATLAS (no problem with LVL1, but HLT: ~3000 nodes)
- …

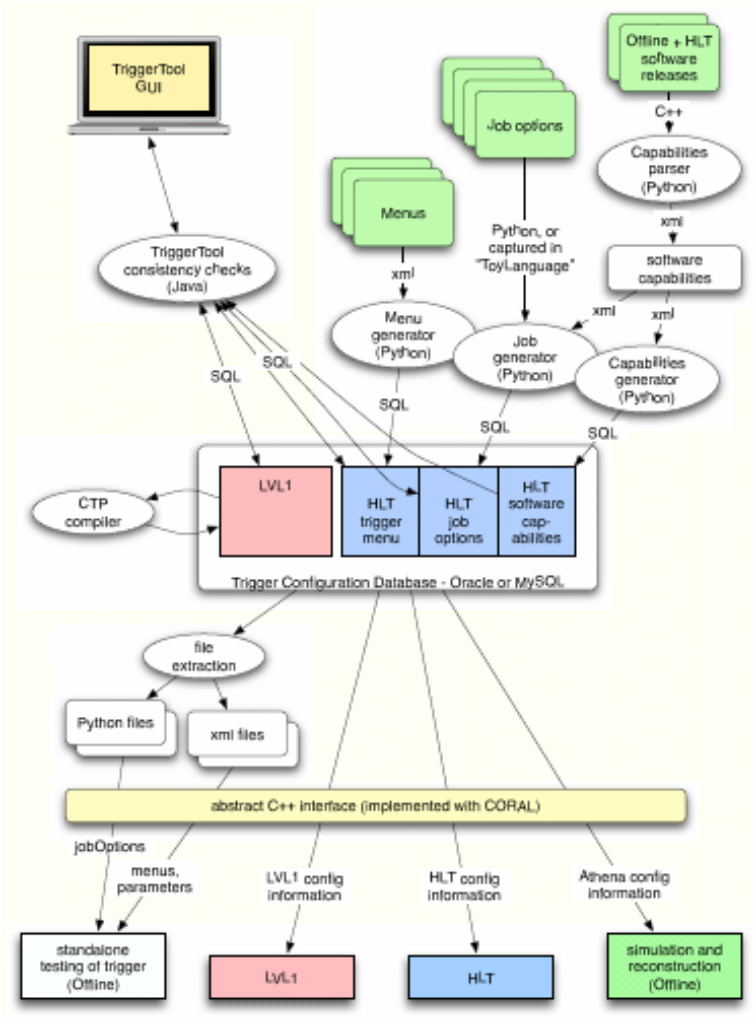
Overview of the foreseen System

Tools for Data input/ DB population: GUI, compilers, scripts,…

Data Storage: TriggerDB, relational DB (ORACLE, MySQL),…

Data Access: direct, XML

Clients: LVL1, HLT, online, offline



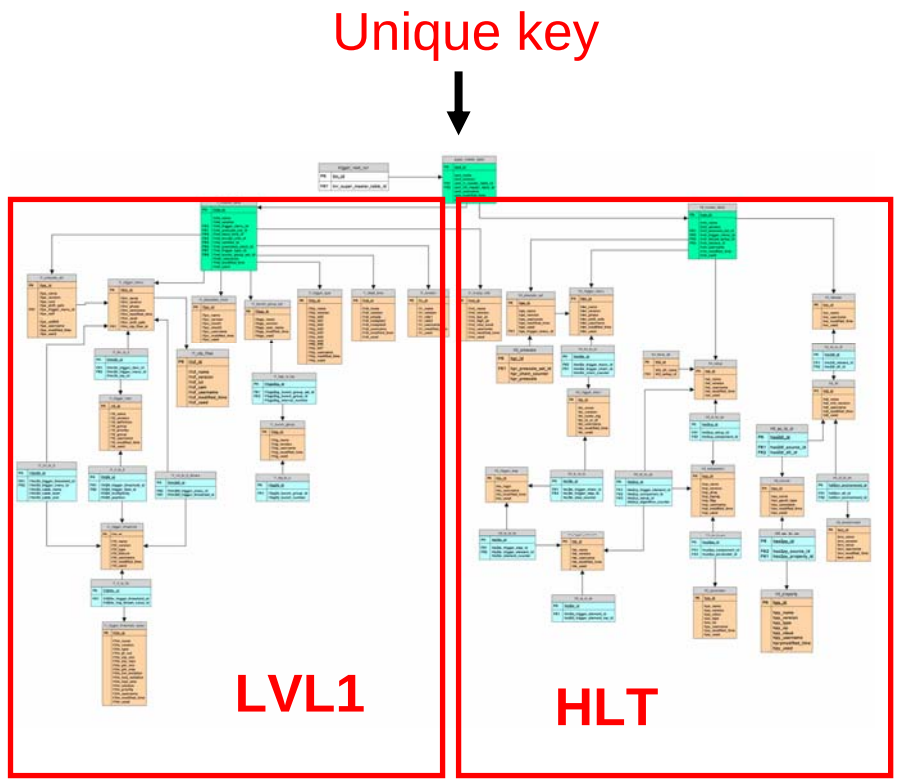
Storage: TriggerDB

- central part of the system
- stores all information to configure the full online selection
- stores all versions with a key

→Configuration and Condition DB

- implemented in SQL (both MySQL and ORACLE)

→ available online and outside CERN (Tier1, Tier2, …) via replications.

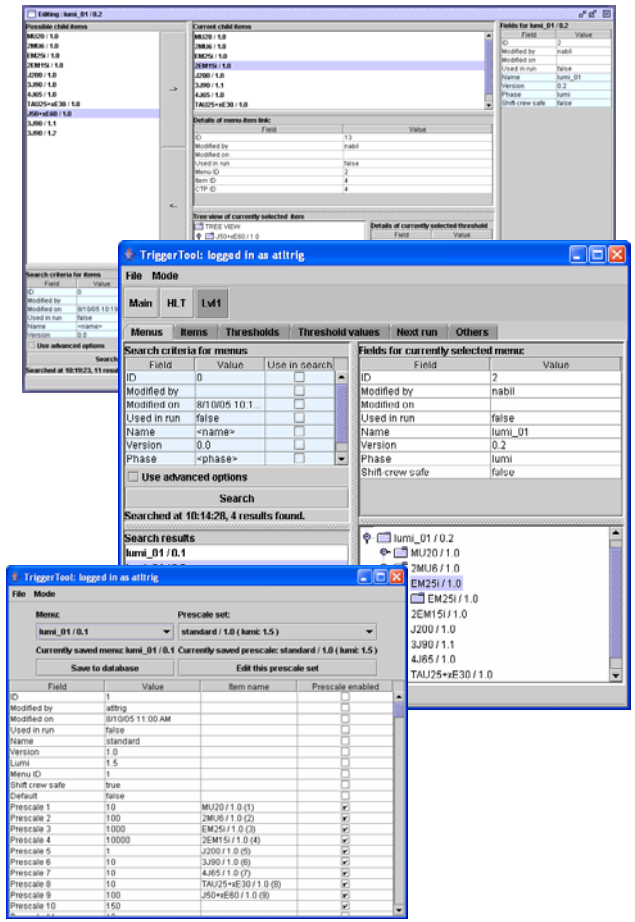


At the moment running on development servers at CERN only.

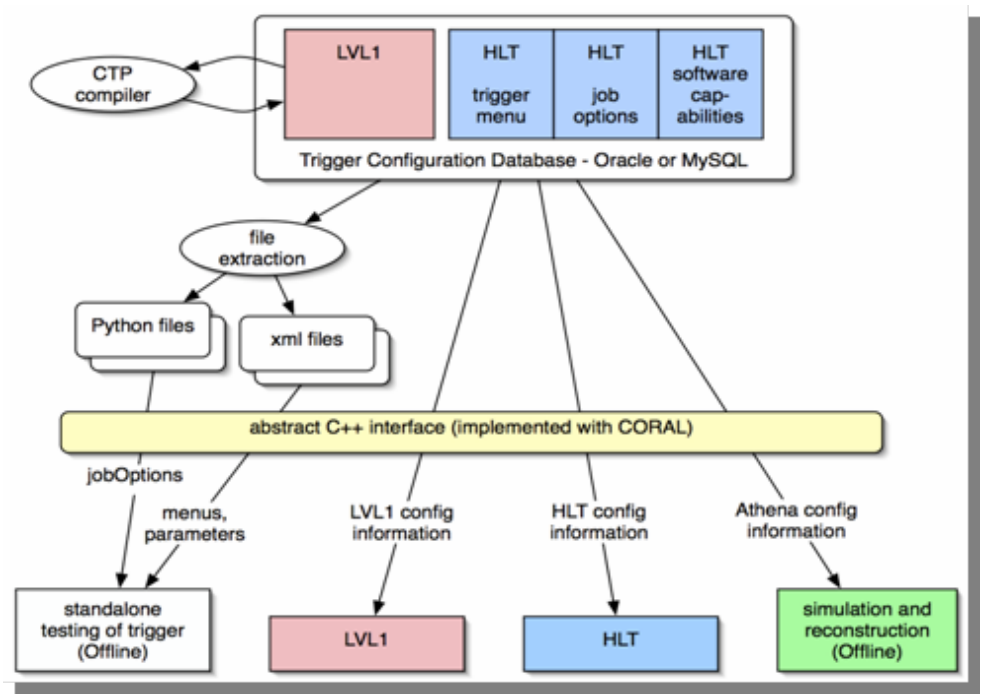
DB population, “Trigger Run Control”

Trigger Tool for consistent operation of trigger is under development

- Java front-end for the TriggerDB
- to be used online and offline (complemented with population scripts)
- three modes are foreseen:
  1) shift-crew: choice of predefined options (menus, pre-scale sets)
  2) user: browse, extract menus in text file for development, simulation etc.
  3) experts: construct and maintain the TriggerDB (some scripts, esp. HLT).



Data access online and offline



two data paths (via master-key):

I. extraction of intermediate files for standalone tests, development, …

II. direct read-out of configuration objects from TriggerDB for online running, production jobs on the grid (simulation, reconstruction)

use of the identical SW online and offline → reduce error-proneness

So far only used by standalone applications

Status, ongoing work

- What I presented here is the foreseen system.
- **There is still a lot to be done**, e.g.:
  - Thorough testing of DB schema
  - Test of scalability (FRONTIER, Web proxy, …)
  - Development of DB population tools, esp. HLT
  - Complete HLT Run Control (TriggerTool) is still missing
  - Integration with all clients
  - Integration with Trigger Monitoring (both LVL1, HLT see Martin)
  - Additional functionality for L1 Hw compilers
  - Offline reconstruction expressed strong interest to use our system for Job configuration (remember: HLT runs ATHENA)
  - Integration with offline data analysis
  - Further work on the operation model (what to change when?)
  - ...

The last slide

- Activity started 1 year ago → still in dev. phase
- Very nice atmosphere in TrigConf Group:
  Thorsten Wengler, Hans von der Schmitt, Andreas Hoecker, Andre Anjos, Takanori Kohno, Werner Wiedenmann, J. Haller
- **New people from DESY are very welcome to join !**
  - Mike already joins regularly our meetings by phone from HH
  - I will do the same once I'm in HH
  - Some Trigger Configuration Activities in HH would perfectly fit to the Trigger Monitoring Activities in Zeuthen.
  - People could start right away being productive (SW rather independent)
  - Could make use of the HLT rack at DESY for online tests?
- For interested people: see
  - Hyper News Forum (ATLAS/Trigger/Trigger Configuration)
  - Twiki page (TriggerConfiguration, rather outdated, will be reactivated soon)
  - CHEP06 talk by Hans von der Schmitt (ArXiv:physics/0602180)