

TRT RTT Validation Id Week

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Outline:

Introduction

Status

Further Plans

Introduction



- Goal:

Monitor the impact of the ATLAS software changes on the TRT performance ("obvious" changes in TRT software/ other packages not in TRT domain)

- Motivation:

Detect bad / wrong behavior of the TRT caused by updates and changes of the ATLAS software

- Strategy:

Check a set of observables (i.e. histograms) related to the TRT performance produced on the nightly release and compare them with references obtained with a trustable/validated release

Comment: This is a purely Monte Carlo validation, observables related with hardware behavior cannot be monitored in RTT (unless the effect is somehow simulated...)





- Developed TRT RTT monitoring tool within the TRT athena monitoring package
 - designed to monitor performance of single, monochromatic particles (electrons, pions, muons 50 Gev, flat in eta and phi)
 - monitors sim/digi/reco chain
 - added RTT folder in the standard monitoring root file
- Monitor the monitoring
 - TRT monitoring itself is now part of the chain => it also needs to RTT monitored
 - Standard sample of ttbar events used here

Previously, unofficial custom ntuples used.

TRT Monitoring gives less overhead, maintenance, debugging

DCube



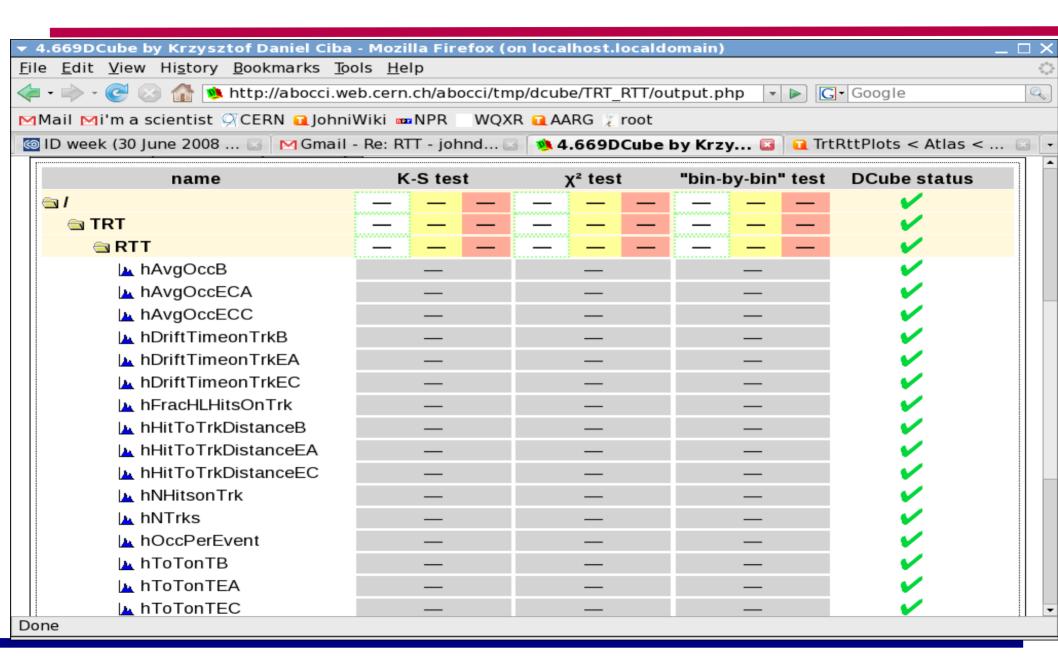
- RTT results now analyzed through DCube

- Framework used by DQMF to compare two versions of a histogram with various algorithms (chi2, bin-by-bin, K-S ect)

- Plots posted directly to the web (easy for offsite/non-expert people)

DCube

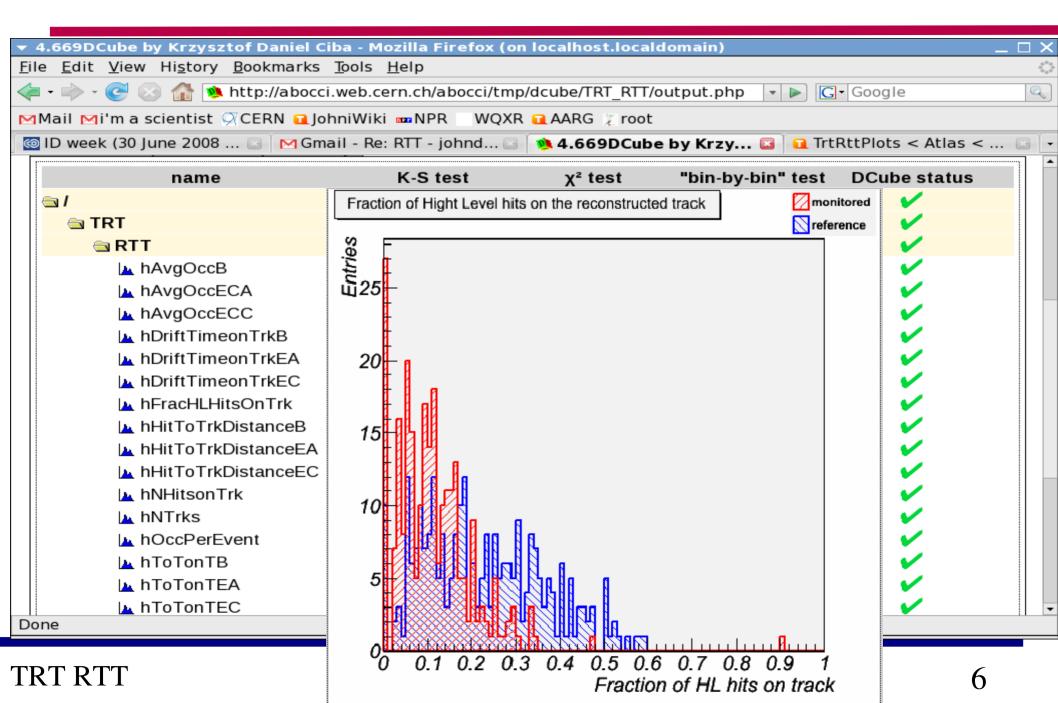




Inner Detector Week

DCube









Beyond the technical implementation the core of the entire RTT validation is the list of monitored plots/observables

Only with experience can we identify the plots most sensitive to software bugs

The RTT is a tool not a solution, it will not be able to detect all effects (particular small ones)

We are still the first line of defense and should validate our code independently





| Proposed Plot | Туре | Is in TRTMonitoring? | Need Modification | Implemented in RTT | "Use in DCube" |
|--|---------|-------------------------|----------------------|-----------------------|-------------------|
| Hits on Tracks | 1D | yes | binning? | yes | yes |
| Recontruted q/Pt | 1D | | | yes | yes |
| Occupancy vs Barrel Module | Profile | yes | | yes | yes |
| Occupancy vs Endcap Wheel | Profile | yes | | not yet | yes |
| High Level Occupancy vs Barrel Module | | yes | | yes | yes |
| High Level Occupancy vs Endcap Wheel | Profile | yes | | no yet | yes |
| Drift Time | 1D | yes | | yes | yes |
| Hit/Track Distance | 1D | yes | | yes | yes |
| Occ per Event | 1D | yes | | yes | yes |
| nHits per Event | 1D | yes | replaced | no | no |
| Num reconstructed tracks | 1D | yes | | yes | yes |
| тот | 1D | yes | | yes | yes |
| Trailing Edge | 1D | yes | | yes | yes |
| Leading Edge | 1D | yes | | yes | yes |
| | 45 | | | | |
| Wire/Track Distance | 1D | 1.44 /// 11 * | 1- /4 '1 ' /1 ' / | view/Atlas/TrtRttl | D (- (' |

Inner Detector Week

Plans



- Iterate the plots, binning ect. through feedback, experience
- fill holes / find missing links
- Develop and automate tests detect changes (for good/worse)
- Run on previous releases, with known TRT problems, ensure sensitivity
- Integrate with Inner Detector RTT