ALICE offline week

Steffen Weber November 19, 2014

TECHNISCHE UNIVERSITÄT DARMSTADT

Calibration in the HLT: status and plans

Motivation

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- Run 3 : high luminosity + TPC in continuous readout mode
  - → huge amount of data, reduction factor of ~20 is needed to store
  - calibrated data is needed to efficiently reduce data size

    → online calibration is needed

- Run 2 : Show feasibility of online calibration, different scenarios:
  - conservative: cpass0 in HLT, following passed offline
  - ambitious: feed back calibration to reconstruction, after two feedback loops all detectors are calibrated, no offline passes needed

Motivation

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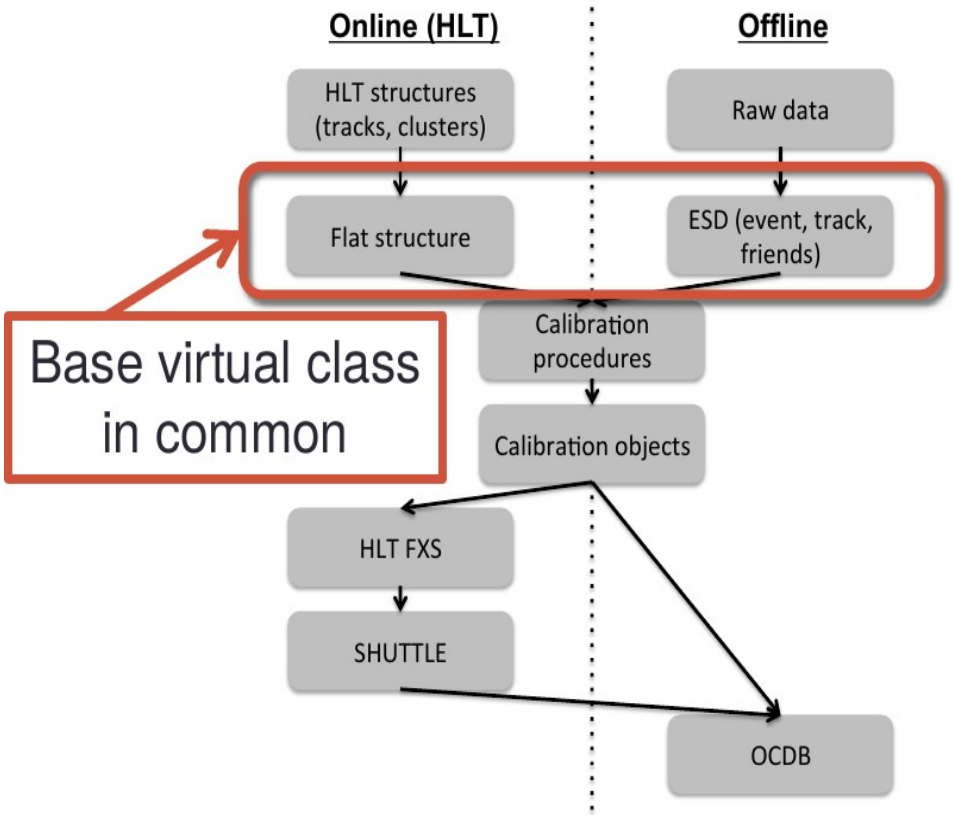
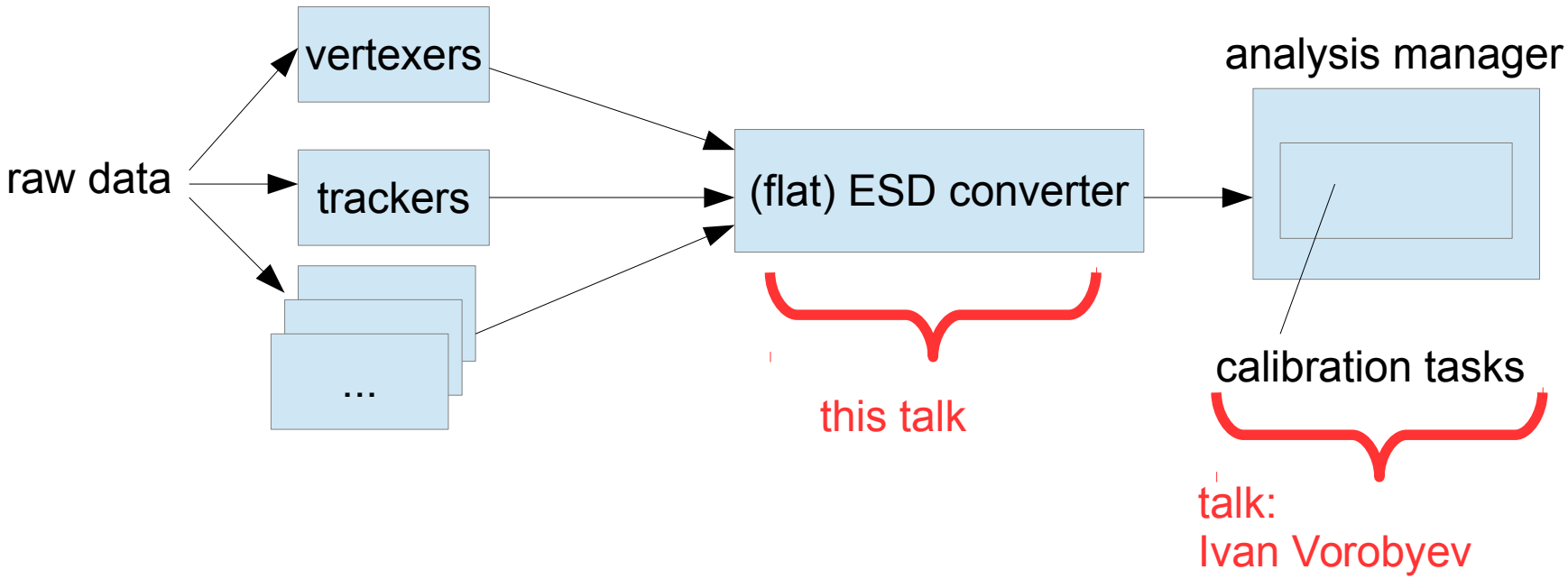
- current ESD objects (AliESDEvent, AliESDTrack, …) are too heavy to use online:
  - data is shifted in memory between processes, objects need long time for (de)serialization
- internal HLT data structures not suited for calibration
  - whole calibration code would need to be changed
- → flat ESDs:
  - look from the outside (almost) like ESDs (access methods) → minimal changes in existing calibration code
  - internally flat (all data in one blob of memory)
  - common base class → use ESD or flatESD in same code

Classes overview

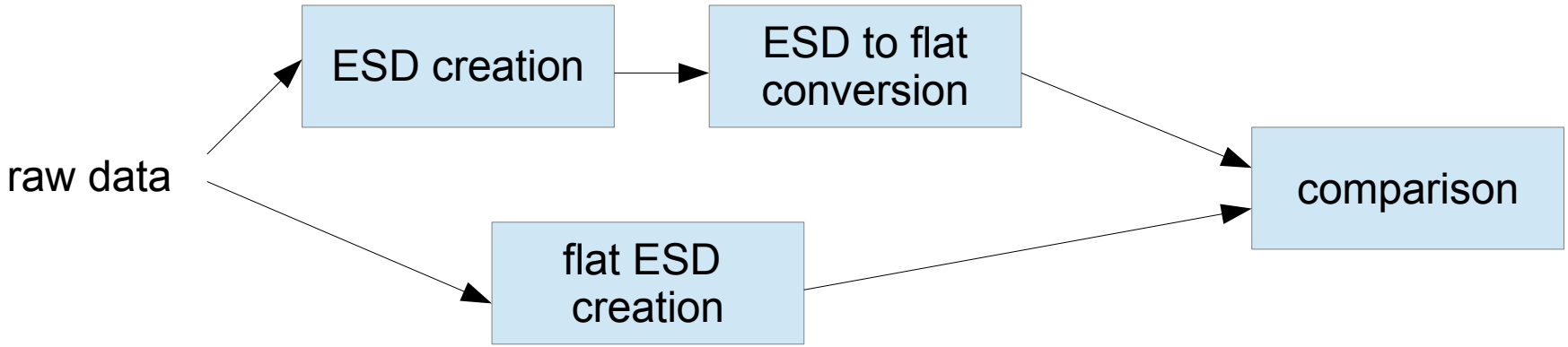


- implementation approaches final state
- AliVevent, AliVtrack as common interface
  → extension of existing classes
- special functions, that produce ESD objects on-the-fly from flat objects

Chain in HLT


raw data
vertexers
trackers
...
(flat) ESD converter
this talk
analysis manager
calibration tasks
talk:
Ivan Vorobyev

Benchmarking and consistency checks



- Created HLT chain to get timing information and consistency checks
- ESDs and flat ESDs are created, ESD converted, result is compared: loop over all tracks, clusters, … and comparison of all data members
- AliSysWatch in components produce information on timing, memory consumption, size reduction

Latest developments

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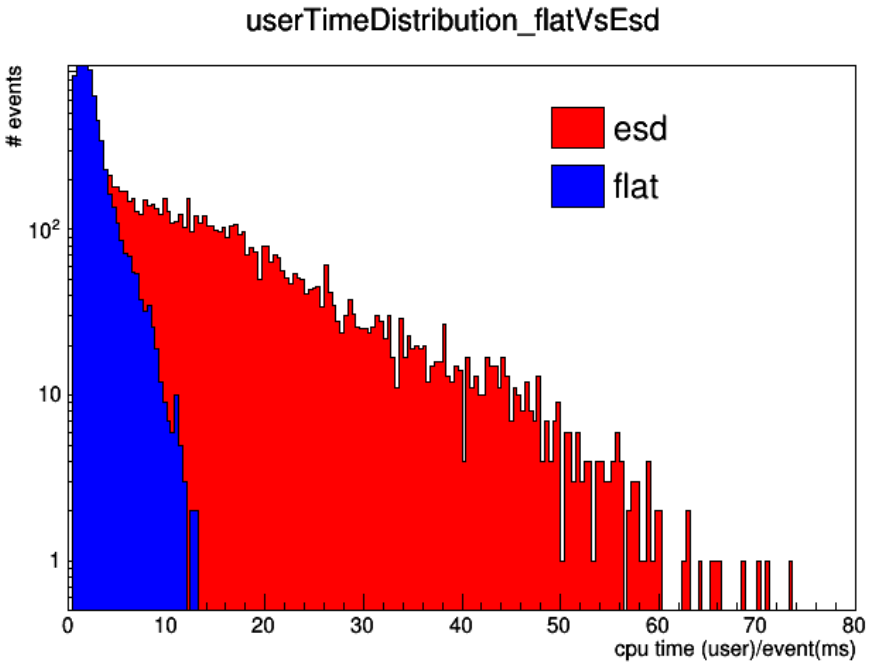
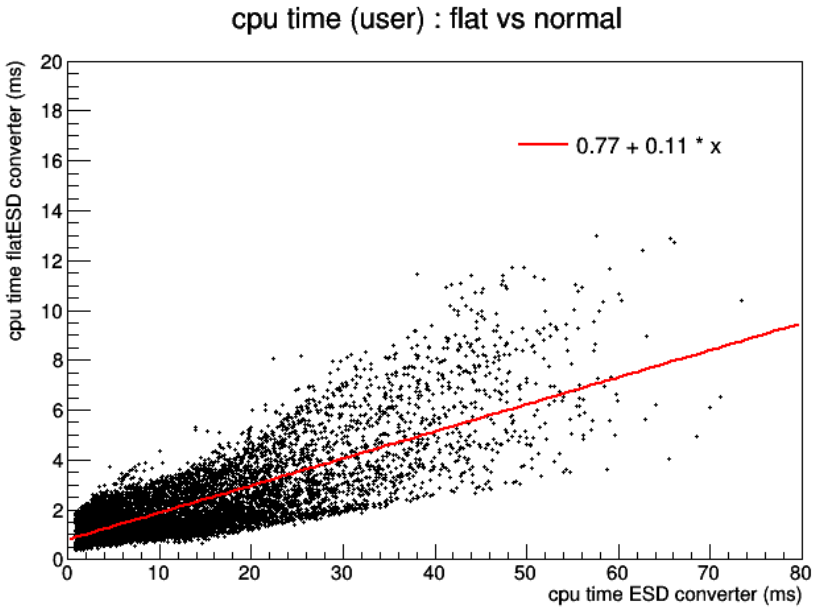
- Converter functions are tested on simulated events (9600 MB pp events, ~100 MB Pb-Pb events)
- After intense coding and debugging sessions in the last two days (thank you to Sergey Gorbunov): lots of bugs fixed
  - All data members correctly set, content is the same from ESD converter and from flat ESD converter
  - No crashes , memory corruption, etc.
- ITS SAP now fully implemented, tested and debugged both in ESD and flat ESD converter
- Friends now fully implemented, tested and debugged both in ESD and flat ESD converter

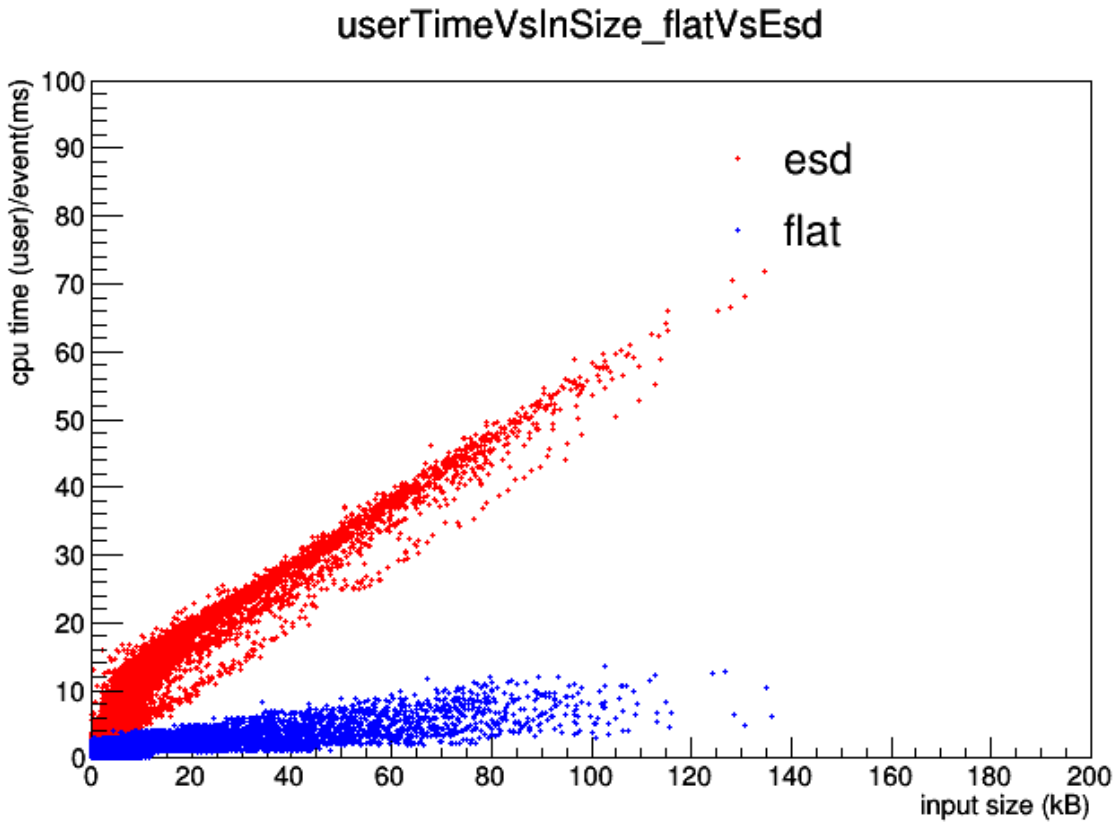
Timing: cpu time to create one event (pp)





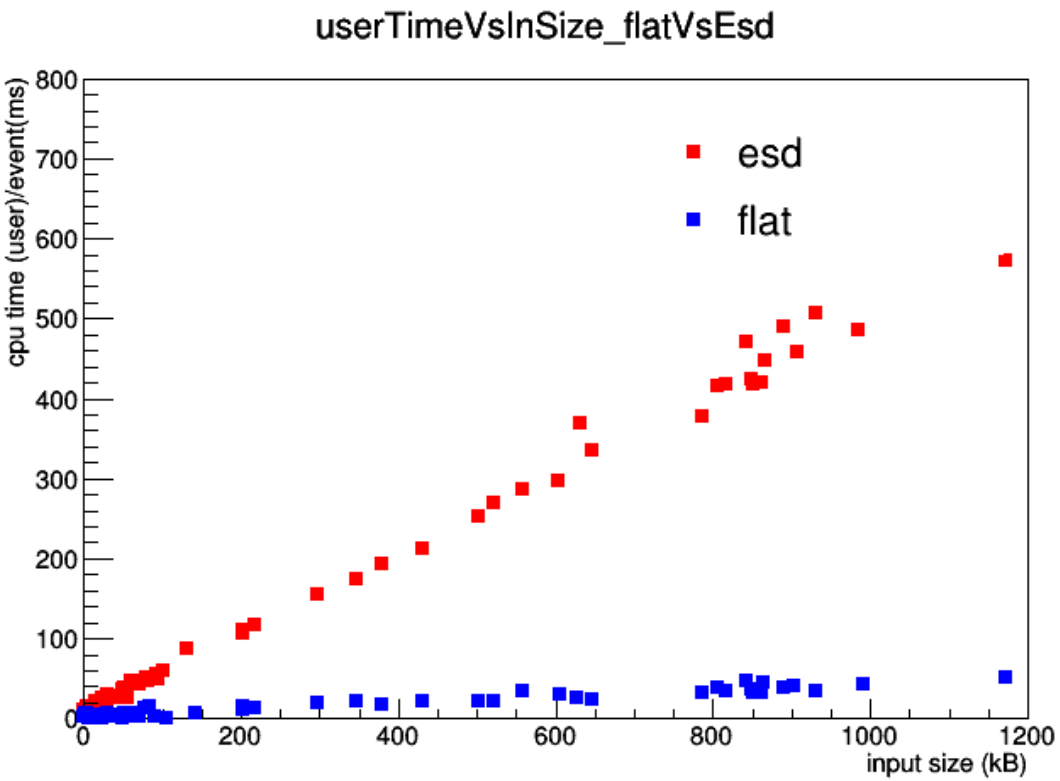
- creation of flat event on average 9 times faster than ESD event
- Maximum needed time: around 20ms for flat, 80ms for ESD

… as function of input size



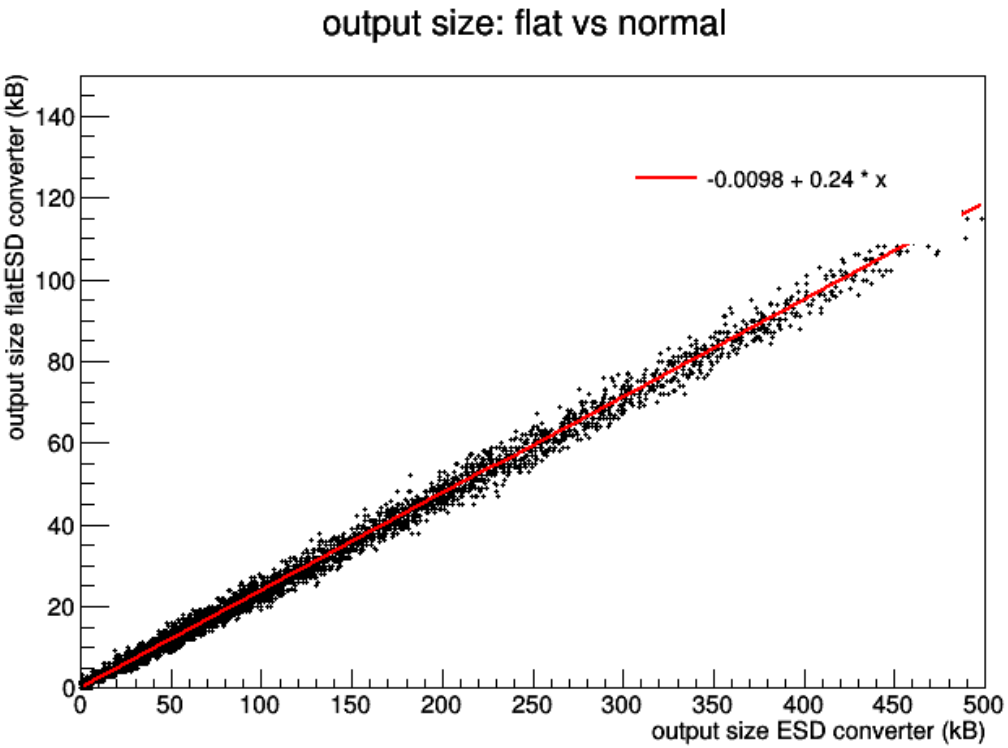
- Needed time scales linearly with input size

… and for MB Pb-Pb events



- linear scaling holds also for larger event sizes
- flat creation below 100ms, ESD creation up to hundreds of ms

Size comparison (pp MB)



- size of flat event about 24% of ESD event

Next steps

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- Started:
  - investigate central Pb-Pb events
  - More detailed time performances
- Now, that creation/ conversion of flat ESDs is fully implemented, porting of TPC calibration code is next step → next talk by Ivan Vorobyev
- Important question: where is the majority of time spent?
  - Creation of events?
  - Actual calibration code? → then also changes in calibration algorithms necessary