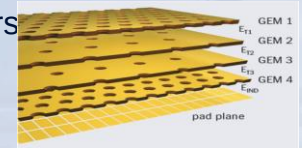
ALICE online and offline data processing in LHC Run 3

- Pb-Pb data taking at 50 kHz.
- No trigger, continuous read out.
- All minimum bias events recorded.
- Full online processing in software: compression and calibration.

- Major upgrade of detectors
  - GEM TPC.
  - 7 layer pixel detector.



- Challenges for online processing:
  - TPC space charge distortion corrections combining 2 methods:
    - Track based calibration.
    - Integration of digital currents.
  - TPC data compression (storing 50x more events than before):
    - Evolution of clusterization and entropy compression as in Run 2.
    - Track model compression.
    - Removal of tracks not used for physics.
  - Tracking in TPC with continuous readout.
    - No a-priori knowledge of *z*-coordinates of hits.

- Two-stage processing with disk buffer:
  - Synchronous processing during data taking (calibration / compression).
  - Asynchronous processing when no beam for final reconstruction.

- Usage of GPUs to speed up processing:
  - 2 possible GPU architectures:
    - AMD Vega20
    - NVIDIA Turing
  - Mandatory during synchronous processing (baseline solution).
    - Aiming for best GPU usage also in asynchronous phase (optimistic solution).
  - Current estimates foresee ~2000 GPUs in ~250 processing nodes.