Update on the new e/γ framework

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Summary

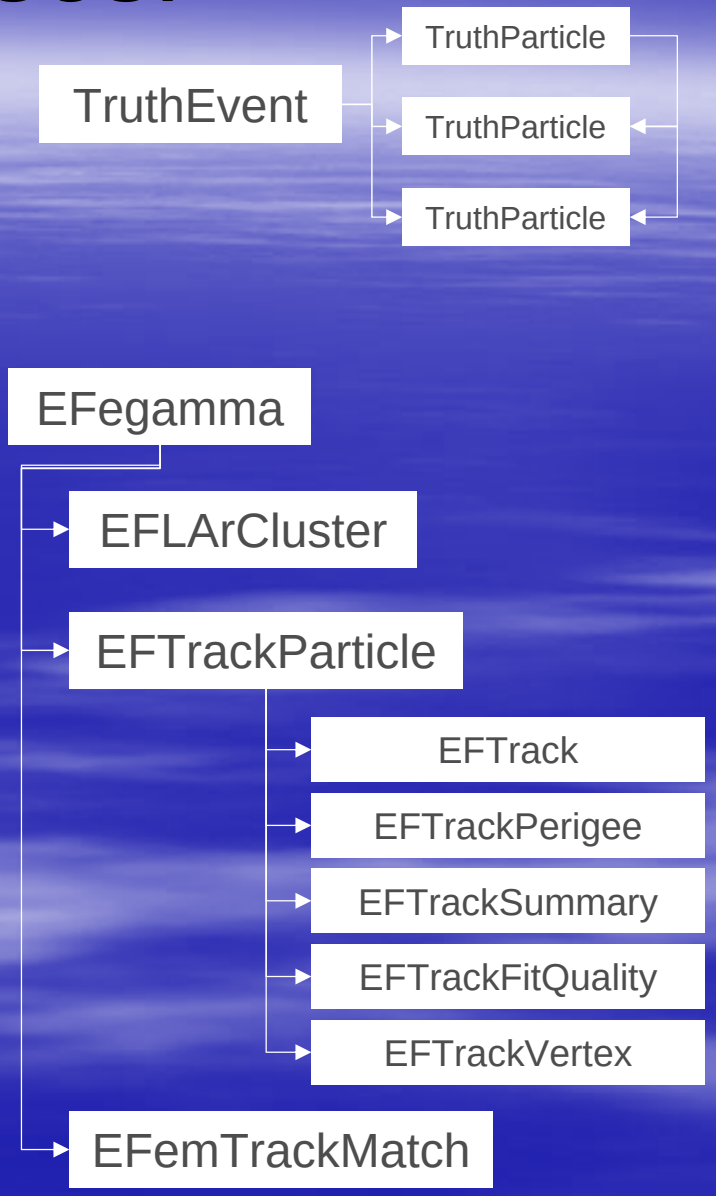
- Last report on framework in June: http://agenda.cern.ch/fullAgenda.php?ida=a053914

only oral reports in egamma meetings after that

- Since then mainly summer holidays
- Current production release v0.1.11
- The plan was to produce a new release before holidays but this didn't work due to time and technical problems
- Development version v0.1.12 presented here:
  - Data objects extended to EF: egamma objects, tracks and clusters …
  - TruthEvent added: generated particles and decay chains
- New production version (possibly v0.2.0) out soon

New data classes:

- Tried to replicate Event Filter data objects in a simplified way but, wherever possible, keeping method names and structure.
- TruthEvent – does the role of Athena's McEventCollection; contains vector of:
  - TruthParticle – based on TruthParticle and simplified; contains 4-momentum, PDG id, status, pointers to its mothers and daughters to reproduce decay chain
- EFegamma – based on Rec::egamma; points to:
  - EFLArCluster – based on EMShower with an additional variable (to avoid the need to replicate CaloCluster as well as EMShower)
  - EFTrackParticle – based on Rec::TrackParticle; points to:
    - EFTrackPerigee – based on Trk::MeasuredPerigee; inherits from EFTrackParameters; points to EFTrackErrorMatrix
    - EFTrackSummary – based on Trk::TrackSummary
    - EFTrackFitQuality – just the χ^2 and NDF
    - EFTrackVertex – not filled for the moment (not enough info in ntuple)
    - EFTrack – based on Trk::Track and greatly simplified; points to:
      - EFTrackPerigee
      - EFTrackFitQuality
  - EFemTrackMatch



Helper methods in EventBuilder

- Additional classes – needed to replace CLHEP (avoid dependencies):
  - ThreeVector – for track parameters etc
  - FourVector – for TruthParticle 4-momentum
  - SymMatrix – for track covariance matrices
  - Matrix – base class for SymMatrix
- EventBuilder has become a rather large class, which does a lot of work. This is necessary to keep the event building in one place and factor out the ntuple reading from the framework.
- New helper methods
  - BuildEFLArClusters.cxx
  - BuildTrackParticles.cxx
  - BuildTruthEvent.cxx
  - EventBuildEFHelpers.h

To do:

- Complete validation:
  - Some work already done
  - Can now check LVL1 / LVL2 / EF
  - LVL2 track extrapolation – check differences wrt old framework
- Add track-truth association: requested by B-physics triggers
- Other possibilities:
- Add pre-filter, i.e. trigger level run before LVL1 with access to truth to do event preselection
  - Add forced accept on a per trigger level basis
  - Possibility of bypassing one trigger level (same as previous point, really)