EDM: invitation for discussion

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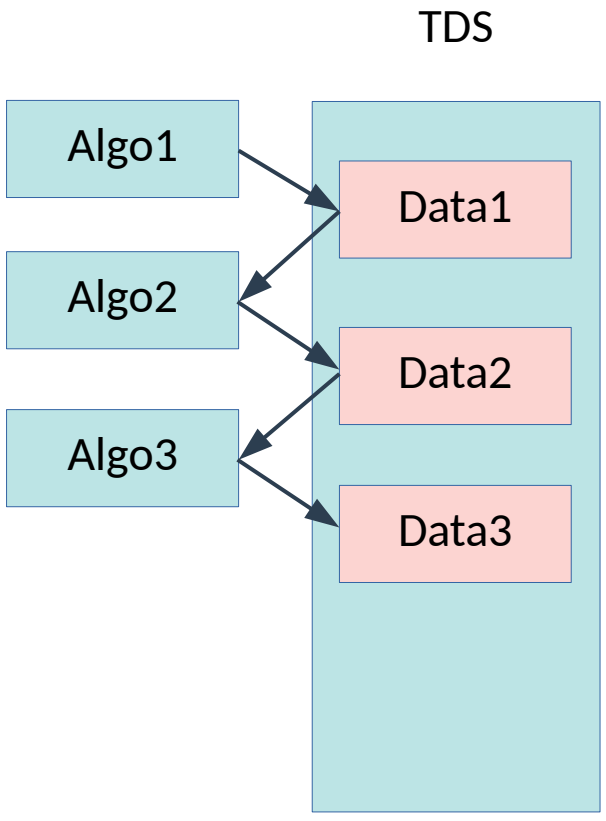
Requirements for EDM

EDM reflects data at each step of analysis **within the analysis framework**.

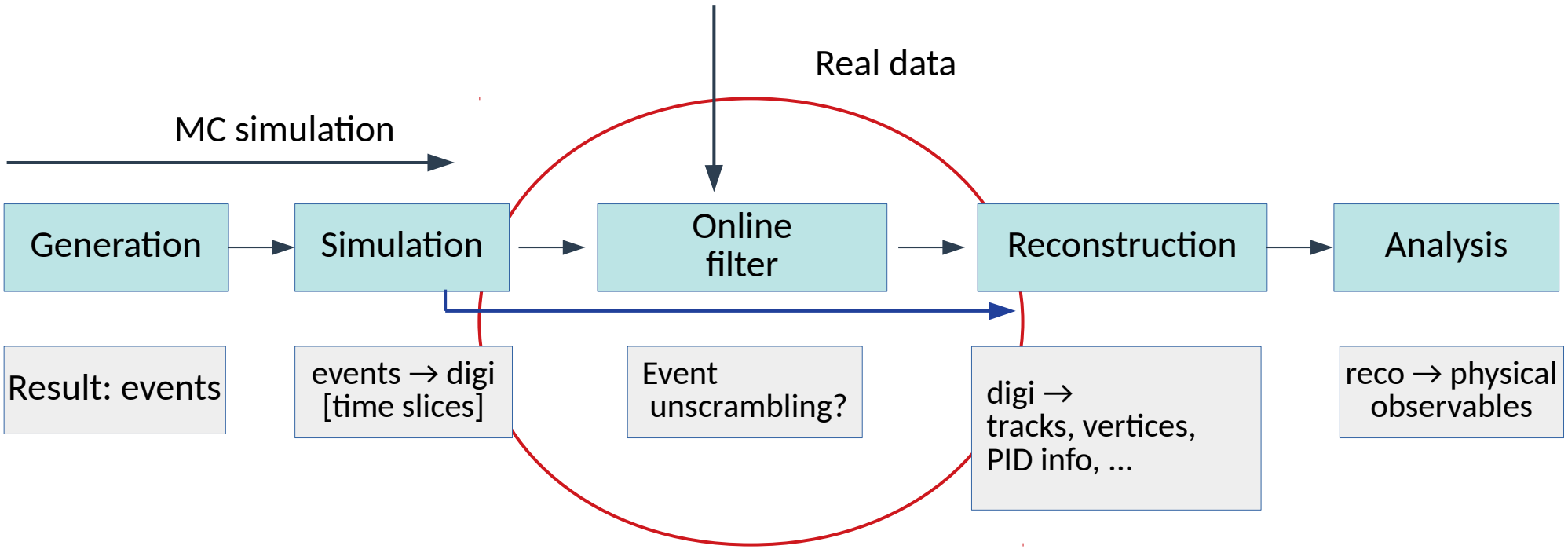
- Consistent with analysis chain.
- Designed for real data analysis
- Containing MC-truth info.
- Data persistence (may be not all stages).
- Minimal size, no duplication, separation of data and algorithms for their manipulation.
- Flexible.



Analysis chain reflects our generation, simulation, reconstruction and data analysis.

- AC is represented as a set of consecutive algorithms
- AC should represent all stages simulation and **real data** analysis (it does not mean that all algos should implemented at once!)

Data analysis chain: global steps



Data analysis chain: more details

Generation

Event [time slice] Generation

Simulation

G4 hit simulation → Digis

Online filter

Fast reco?
Event unscrambling

Reconstruction

Hit reconstruction → Pattern recognition → Track fitting (from primary interaction) → ECal clustering and association with charged tracks → PID with de/dx [and AEG with track association] → Primary vertex finding and fitting (based on de/dx PID)

An attempt to associate with MCParticle → Pattern recognition

T0 for track fitting?
Should BBC be here?

Track momenta are defined in the primary or secondary vertex

Pattern recognition for tracks not from primary vertex.
Finding of secondary vertices; → TOF: associate with track
TOF PID + T0
AEG, etc… → RS reconstruction → D-meson vertices [user analysis?]

Event model: ideas

MCParticle
- id
- status
- PDG_code
- prod_vtx
- prod_time
- initial_momentum
- mother[]
- daughter_list[]

MCVertex
- id
- position
- MCParticles[]

Track:
- charge
- hits[]
- momentum_in_vertex [e, mu, pi, K, p, d?] and covariance
- chi2[]
- ndf[]
- vertex_id
- PID info [de/dx, TOF, AEC]
- association to BBC, ECal, RS
- track states[] in the last and the first track point for extrapolation]
- [MC particle id]

Vertex:
- id
- is_primary
- position + covariance
- tracks[]
- chi2
- ndf

ECal cluster:
- energy
- position
- barrel/endcap flag
- cells and energy depsits
- [MC particle id]

RS segment:
- extrapolated length
- number of hits in a cone
- energy_estimate
- …
- [MC particle id]

PID info:

De/dx
- prob(particle_type)?
- hits_ids[]

TOF
- prob(particle_type)
- cell_id
- track extrapolation pos in a cell

AEC
- has_fired
- cell_id
- track extrapolation pos in cell

ECal?
- prob

RS?
- prob

Conclusion

- Creating EDM for us will be an **iterative process**. We need to start prototyping the full analysis chain for better understanding of our needs.
- The EDM should be
  - tailored for our analysis chain and analysis of real data
  - contain minimal MC-truth info for algo validation
  - be minimalistic, contain only data, not tools to manipulate them
  - encapsulating full information for analysis algorithms at each step of the reconstruction chain
- Prototyping of online filter would important too.
- These are the first ideas. Any suggestions are welcome!