

Proposed change to edm4eic::TrackPoint for track projections

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(with lots of input from Daniel, Nathan, Wouter, Dmitry...)

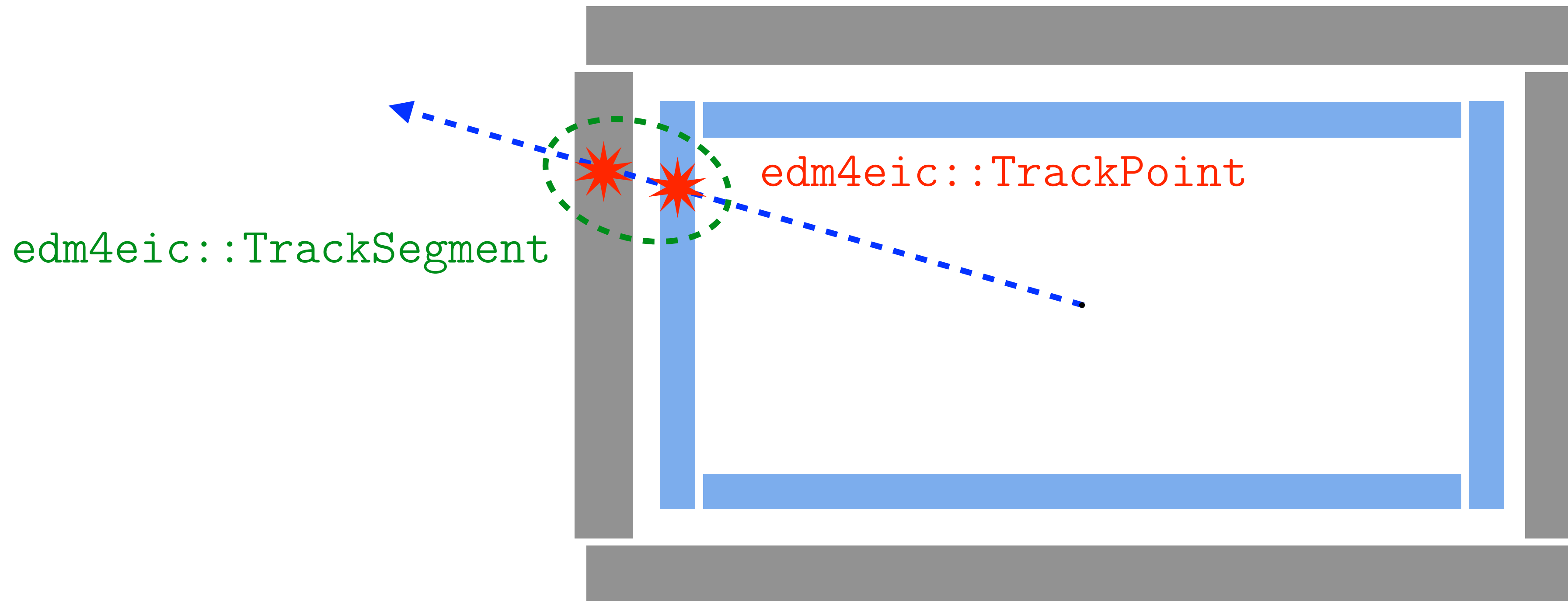
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Motivation for track projections

- Track-cluster required for reconstruction (electron ID, particle flow, etc.)
- Need tracks projected to each calorimeter
- Requirements for projections:
 - Projection plane(s) arbitrarily defined (not confined to actual detector surfaces)
 - Projections stored in PODIO output
 - Well-defined detector/plane identifier for each projection

Using TrackSegment



- TrackPropagator algorithm returns `edm4eic::TrackPoint` (can't save in output)
- Store propagation of single track to multiple calorimeters in `edm4eic::TrackSegment`
- Store propagation of all tracks in `edm4eic::TrackSegmentCollection`

Identifying propagation surfaces in output

- Need to associate propagated point with a detector or detector surface
- Proposed solution: add `int32_t` member to `edm4eic::TrackPoint` to store detector and/or surface identifier
- Flexible uses:
 - If only one propagation per detector is required, can simply store detector ID defined in `epic/compact/definitions.xml`
 - If more granularity required, can use 16 bits for detector ID and 16 bits for surface

Summary and next steps

- Need to associate track projections with corresponding detector/surface
- Adding `int32_t` member to `edm4eic::TrackPoint` is a straightforward and flexible solution
- PR for TrackPoint in EDM4eic:
<https://github.com/eic/EDM4eic/pull/41>
- PR for TrackPropagator factory in EICrecon:
<https://github.com/eic/EICrecon/pull/862>
- Track-cluster matching to follow (eventually EICrecon factory?)