New development in digits_hits

# Command-based scoring

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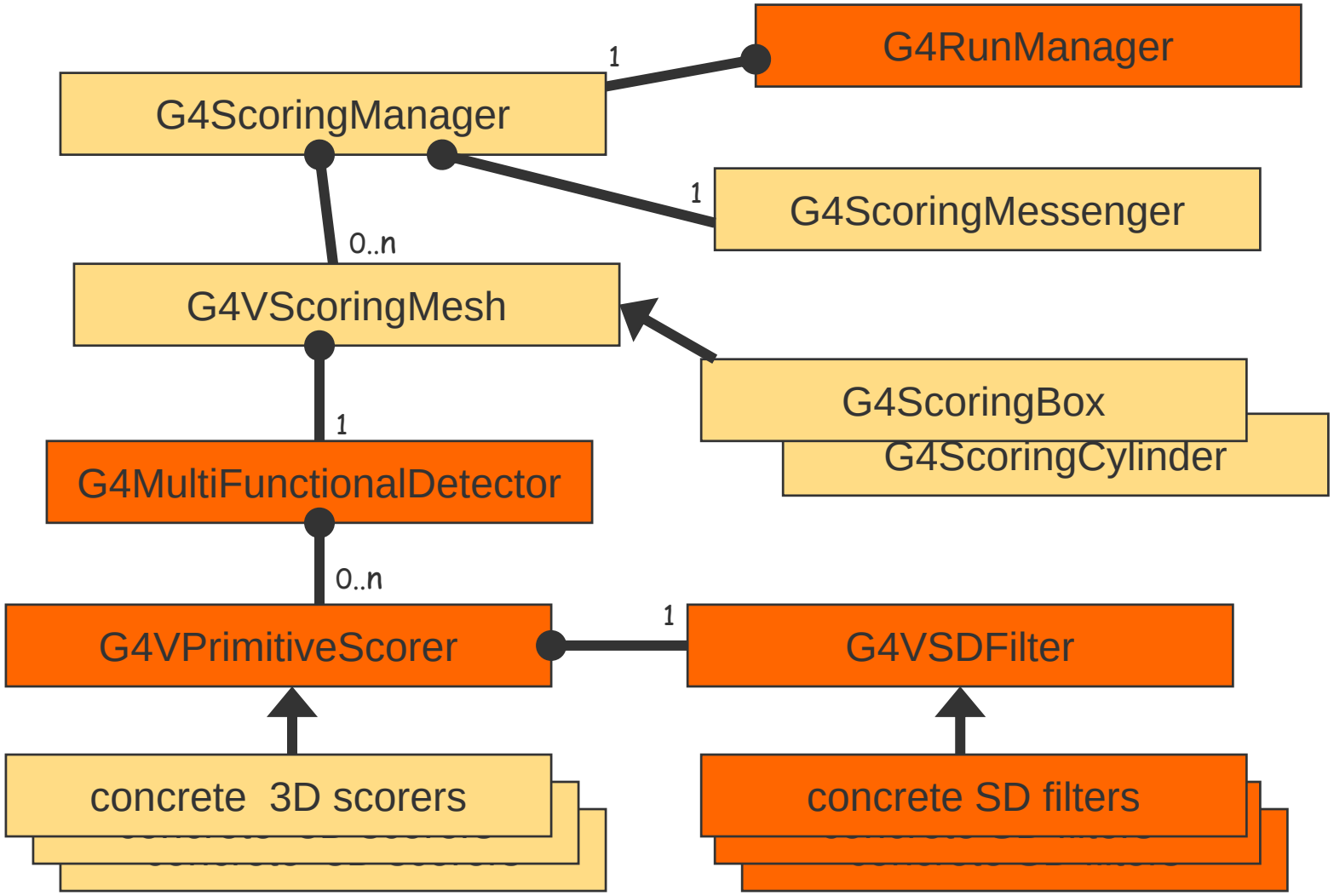
# Command-based scoring

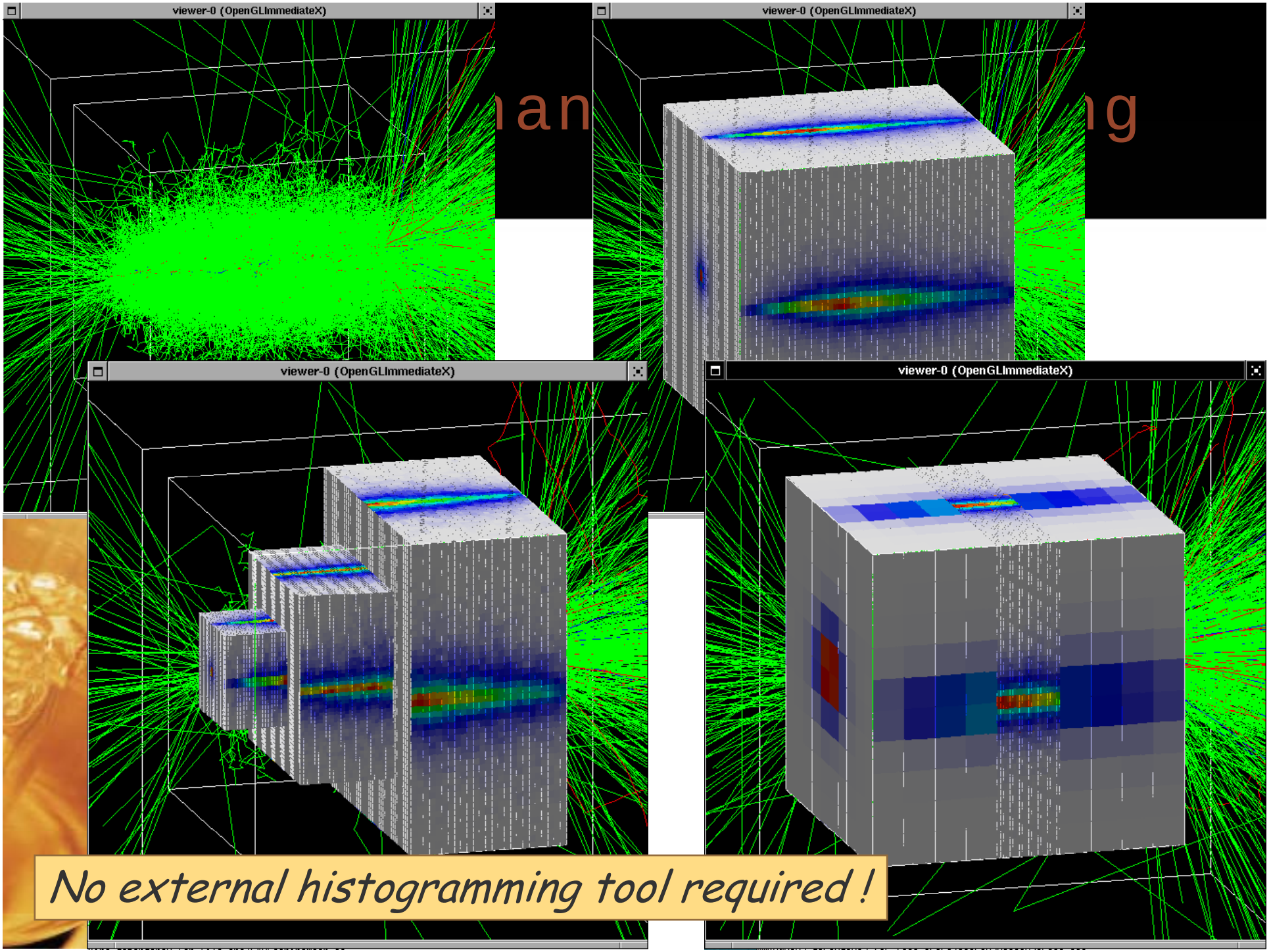
- Thanks to the newly developed parallel navigation, now we can define an arbitrary scoring mesh geometry which is independent to the volumes in the mass geometry.
- Also, G4MultiFunctionalDetector and primitive scorer classes now offer the built-in scoring of most-common quantities.
- Then, why not offering command-based scoring functionality to free the user from implementing C++ source code for scoring.
- Command-based scoring must be independent to
  - user’s code of scoring and/or sensitive detector, also
  - user’s run, event, tracking and/or stepping actions.

# Design


G4RunManager
1
G4ScoringManager
1
G4ScoringMessenger
0..n
G4VScoringMesh
G4ScoringBox
G4ScoringCylinder
1
G4MultiFunctionalDetector
0..n
G4VPrimitiveScorer
1
G4VSDFilter
concrete 3D scorers
concrete SD filters

# UI commands for scoring

- Define a scoring mesh
  /score/create/boxMesh <mesh_name>
  /score/open, /score/close
- Define mesh parameters
  /score/mesh/boxsize <dx> <dy> <dz> <unit>
  /score/mesh/nbin <nx> <ny> <nz>
  /score/mesh/translate, /score/mesh/rotate
- Define primitive scorers
  /score/quantity/eDep <scorer_name>
  /score/quantity/cellFlux <scorer_name>
  /score/quantity/nOfStep <scorer_name>
    currently **20 scorers** are available
- Define filters
  /score/filter/particle <filter_name> <particle_list>
  /score/filter/kinE <filter_name> <Emin> <Emax> <unit>
    currently **5 filters** are available
- Output
  /score/draw <mesh_name> <scorer_name>
  /score/dump, /score/list


viewer-0 (OpenGLImmediateX)
viewer-0 (OpenGLImmediateX)
viewer-0 (OpenGLImmediateX)
viewer-0 (OpenGLImmediateX)
No external histogramming tool required !

# To do

- Development is still in proof-of-concept phase, with naïve expectation of **first beta-release** in December.
- To do:
  - Dump to a file
  - Verify G4CoupledTransportation and G4Navigator for different configurations
  - More drawing options
  - Design/implementation optimizations
    - Current command structure may not be in the final shape.
  - Cylindrical mesh to be implemented
    - Sphere later (much later?)
  - Manual