



EVE: Her essential features and her future

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EVE - History & Development guidelines

History:

- Core development: 2006 - 2009, Exotic features: 2010 - 2011 [at ~ 60% engagement]
- Since then in maintenance (~0!) / user support mode (0.05 - 0.1 FTE)
- Used by (at least) 8 HEP collaborations: ALICE, Belle II, CMS, FAIR*, HyperK, NA62, T2K
 - + several smaller experiments in neutrino, nuclear and medical physics
- EVE was (and probably still is) the only widely used HEP visualization framework.

Factors contributing to EVE's adoption and longevity:

- Distribution with ROOT -- the framework all HEP experiments use anyway
 - zero external dependencies, they will come back from behind with sharp teeth
- Trivial to start using, extensive tutorials up to a mini application with 3 views & event loop
- Put focus on user-support first, on what is needed NOW second, everything else comes after

Some people probably recognize the source of this wisdom ...

EVE - Essential features for HEP visualization I.

Primitives & Algorithms for Physics oriented event display:

- Multi-view / multi-scene design; per view/scene clipping, instancing, camera dependent LOD
- Geometry access & drawing, ability to extract selected shapes for detector outlines
- Flexible track propagator accepting trajectory guides; magnetic field representation
- Automatic non-linear (fish-eye) and scaling transformations
 - Most objects, including geometry shapes should be automatically transformable
 - It should be possible to write custom projected classes (e.g., calorimeters)
- Raw-data visualization classes with flexible palettes and thresholding modes

EVE - Essential features for HEP visualization II.

Object Interaction:

- Object highlighting, outlining & selection (including sub-object selection and multiple selection)
 - Has to work across all views and all derived / projected / detailed representations
- In general: Ability to access and interact with physics objects and experiment data model

Features only available in Fireworks that should be part of EVE:

- Table views with arbitrary expressions of object and constituent functions
- Flexible geometry browser with multiple instances for element selection; overlap checker

Physics Event Display == CAD application

EVE - The future



Already happening - exploration mode:

- JSROOT
- CMS: Fireworks + JSROOT

ROOT-7

- GUI / GL / EVE are all candidates for a major rewrite / restructuring
- Transition towards server-client model seems inevitable (web-based or not)

Both of the above require increase of separation of EVE from GL and GUI.

There seem to be a significant overlap between HSF Viz & ROOT-7 3D graphics

- The collaboration could work both ways ...

CMS has strong interest in keeping EVE alive but we are open to any collaboration.

- The main point is maintaining full functionality of our event visualization.