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Next generation of OpenGL support in ROOT

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OpenGL has been promoted to become the main 3D rendering engine of ROOT. This required a major re-modularization of OpenGL support on all levels, from basic window-system specific interface to medium-level object-representation and top-level scene management. This new architecture allows seamless integration of external scene-graph libraries into the ROOT OpenGL viewer as well as inclusion of ROOT 3D scenes into external
GUI and OpenGL-based 3D-rendering frameworks.
Scene representation was removed from inside of the viewer, allowing scene-data to be shared among several viewers and providing for natural implementation of multi-view canvas layouts. The object-graph traversal infrastructure allows free mixing of 3D and 2D-pad graphics and makes implementation of ROOT canvas in pure
OpenGL possible. Scene-elements representing ROOT objects trigger automatic instantiation of user-provided rendering-objects based on the dictionary information and class-naming convention. Additionally, a finer, per-object control over scene-updates is available to the user, allowing overhead-free maintenance of dynamic 3D scenes and creation of complex real-time animations. User-input handling was modularized as well, making it
easy to support application-specific scene navigation, selection handling and tool management.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

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