WebGUI/Graphics

Axel Naumann, ROOT Godparents' Meeting, 2018-10-10

Situation

- Multiple back-ends:

  - X11, GL, Cocoa, Windows

  - Cocoa has ObjectiveC code; all have OS-specific (expert) code

  - foundation is TVirtualX from 90ies; bending backwards for Cocoa, GL

- GUI is big: >110k code lines

- Qt+ROOT broken on Mac ("WindowID"); Win API non-accelerated (and through X11-adapter); **GL deprecated on Mac**!

"Web?"

- Use browser canvas as window content

  - platform independent!

  - HTML, CSS, JavaScript de-facto viz standard

  - many, MANY libraries we can use: OpenUI5, d3, three.js etc

- Works for local application as well as remote displays

- Multi-client support, device interoperability

C++ vs JS Painters

- JSROOT (intentionally) created a parallel universe, in 2012

  - painters (histogram-to-lines) either in C++ or JavaScript

- Implemented and exercised most functionality

  - but goal was "as close as possible to TCanvas"

New Graphics

- RCanvas: better defaults, better positioning, better legend, better interfaces / ownership, better options (vs strings), multi-thread support, etc etc

- Displaying of RHist (+ future RGraph etc) only on RCanvas

- Web-only

User Demand

- Common DQM issue

  - several experiments have massive performance issues

  - ROOT's I/O and histogram solves this

- Considerable physicists' time spent on styling graphics

  - investing in better defaults + simpler interfaces benefits everyone

Steps

- Make "web graphics" accessible (in display-only mode!) for TCanvas, next to x11, cocoa etc

- "Minimum viable product" for v6.18: RHist + RCanvas + graphics primitives + drawing options + fitting

  - reasonable for DQM, playground for physicists

- In parallel: evolve WebEve from "TEve on web" to new interface style

- Incorporate feedback while expanding features, a la RDataFrame; move out of ROOT::Experimental:: once solid

Meta-Goals

- Rejuvenation of ROOT graphics

  - look&feel (esp defaults); ease of use

- Succession / transitioning for masters of GUI + graphics

  - prepare for next 20 years

  - easier to find JavaScript expert than C++ GUI / GL / ... experts