The ROOT Vision (2)

Axel Naumann, 2017-05-23
Analysis Ecosystem Workshop, Amsterdam

Simple

Efficient

Efficiency

- Measure is physicist brain efficiency
  - increase number of publications per week, not cpu utilization
- We want physicists to learn programming basics
  - expressive, right tool for the job; experiments need devs
  - data analysis + coding = asset for job market

Efficient ROOT

- Obvious interface for the task at hand: solution-oriented code search

- No debugging
  - in user code, because errors are caught
  - in ROOT, because it's tested
  - in the interface, because it's clear and clean (and possibly reduced)

C++!

- HEP doesn't trash 50MLOC C++, just now
- C++ serves us well. Gives:
  - speed that is hard to beat, interfaces to throughput-centric packages
- But C++ doesn't come for free. Needs:
  - education; more brain than other languages

Python!

- Python is a glue and config language
  - for glueing and configuring HEP C++
- We have PyROOT: a world-class, unique, fantastic binding
  - we *must* build it on top of cling, not ROOT!
- C++ defines, Python binds.

JavaScript, Go,…

- Many bindings are provided by community
  - dynamic ones survive
- JavaScript plays a vital role in display / GUI

Binding Summary

- Let C++ do the heavy lifting
  - I/O, number crunching, aggregation
- Need to optimize data pipes into other languages!
  - TDataFrame-style interfacing?
  - e.g. PyROOT should map branches to numpy arrays!

Simplicity

- Simple install
- Simple use
  - no setup: running a binary just works
  - documentation, tutorials, forum (= almost immediate help)
- ‘Net (stackoverflow,…) solutions must be relevant

Vision != Now? YES!

- ROOT must focus on
  - simplifying
  - I/O, math/hist, graphics, foundation (HEP-boost)
  - concurrency under the hood
  - glue options, not re-implementing features!
  - C++ and PyROOT

“ROOT”?

- “I can go from one physics group to the next, and even from one experiment to the next - I know the tools!”

- We take central responsibility for performance and functionality: HEP relies on ROOT, ROOT is responsive. You benchmark ROOT, HEP benefits: huge synergy. [Try influencing protobuf.]

- ROOT has provided what the community needs; no plans to change that! (But would benefit from review.)