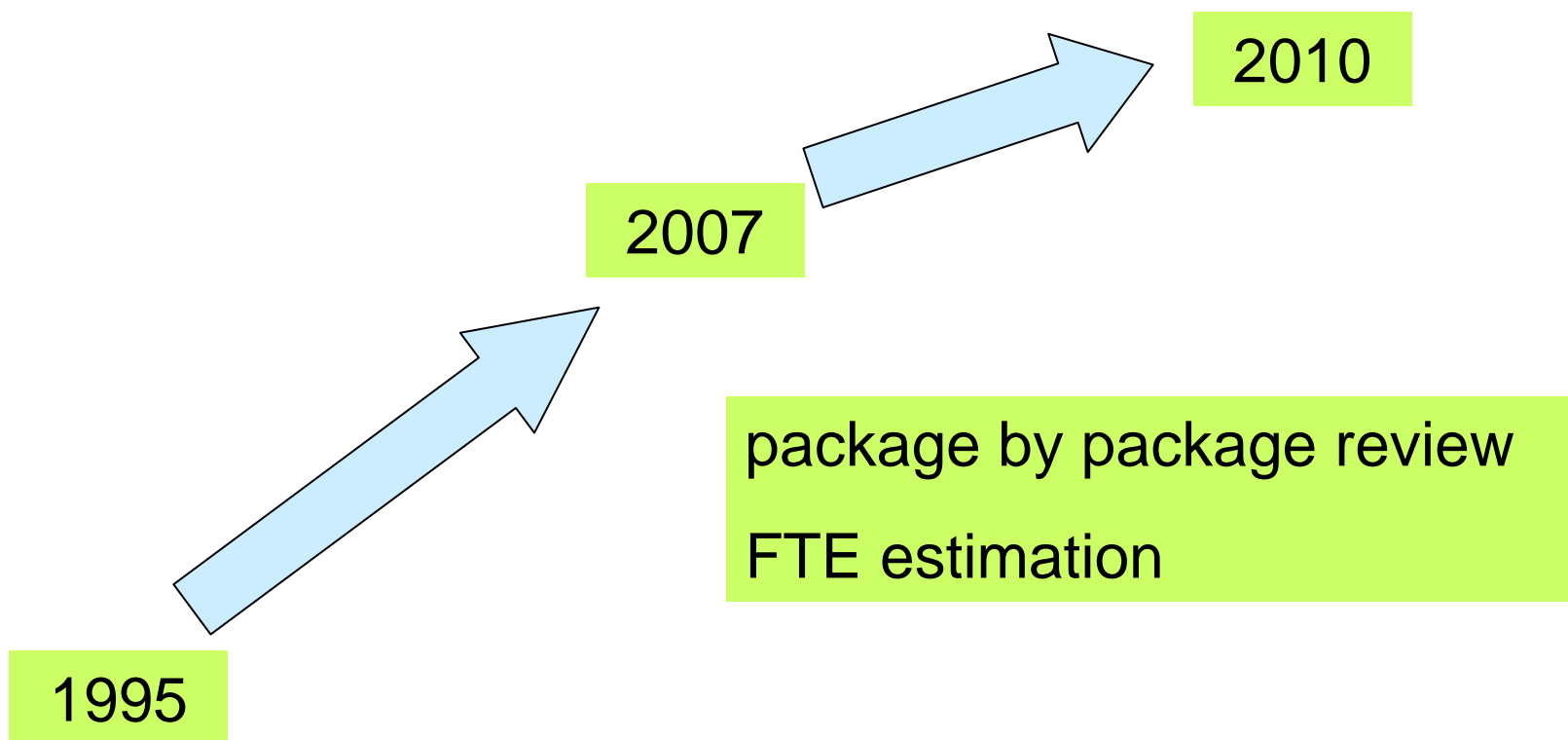




# Ideas for ROOT in the future



*R.Brun*  
*ROOT Team Meeting*  
*14 Dec 2006*





# CINT/Reflex



- Hoping for a concrete demo at the workshop.
- My guess is that it will take at least one more year before we have a robust and complete system, including meta->Reflex
- From C to classes
- Very important: support for multithreading
- Persistent dictionaries (a must)
  - ◆ -> Load only dicts when required.
- Alternative to function stubs using the ABI
- Urgent: a proposal for a new class structure (what users see)
- Estimated FTE: CINT/**1**+0.3, Reflex/**0.2**

Red: at CERN  
Black: outside



# pyroot



- **Must be fully adapted to Reflex.**
- **I am worried by the huge number of side-effects coming from the impedance mismatch C++/python.**
  - ◆ **See reports to Forum or Savannah**
- **I am worried for the long term support (manpower and expertise)**
- **The project runs a risk to be divided between the pro and against python as the scripting language for ROOT**
- **Estimated FTE: 0.1 +0.4**



# CORE



- **libCORE restructure: now 10 MBytes. 5MB would be better or even 2MB without G\_\_s (see later)**
  - ◆ TMath, TComplex, TRandom1,2,3 to **math/libMath**
  - ◆ New **libMath** will include a subset of **libMathCore**
  - ◆ TFile, TBuffer, zip, etc to **io/libRIO**
  - ◆ TColor, TStyle, TView to **graphics**
  - ◆ see consequences
- rethink the **SavePrimitive** such that it can generate non-C++ code too (eg python)
- **TSessionManager** coherent with PROOF
- Estimated FTE: **0.5**



# Input/Output



- Fix memory leaks in case of **TChain::SetAddress**
- Implement conversions of std<->ROOT collections or basic C types
- Add support for unzipping in a separate thread (imminent from Leo)
- Improve cache management for Trees and activate cache in non-Tree case
- more support for multi-threading
- Improve **TStreamerInfo::Compile** to group similar data types to improve performance.
- **I am worried by the complexity of the schema evolution and I am afraid it may become even more complex. Who is going to maintain this stuff in 10 years?**
- Estimated FTE: **0.7 + 0.5**



# Trees



- Add automatic support for **MakeClass mode** when reading only one or a few branches of a top level branch (very frequent use case)
- Improve **MakeProxy** mechanism.
- Make a TChain out of **zip file**.
- Resume work on **Bitmap Index** class with Berkeley
- Implement a **TVirtualTree** or/and **TVirtualBranch** such that the `Tree::Draw` machinery can also be used on foreign files.
- TTreeFormula (and TFormula too) should be redesigned/documentated to facilitate future maintenance.
- Estimated FTE: **0.3 + 0.4**



# PROOF



- a lot of work remains to be done to tune/consolidate the system
- simplify and make it default option in multi-core cpus
- provide a **0 slave mode** (simple client server for eg lxplus)
- provide a simple base class (TProcess or **TProofTask**) that can be used for generic parallelism without trees.
- think PROOF in case of thousands of local disks (dpm/xrootd, etc)
- think PROOF for the future in case of fast networks (no limitations with local disks anymore).
- Scheduler(s), DPM(s) interfaces
- Estimated FTE: **2** in team, more outside



# Math



- Rethink the **MathCore** structure in view of the new libCore, such that dependencies from TF1 become possible.
- A small fraction of MathCore going to new Math
- Estimated FTE: **0.5**





# Hist/Spectrum



- Code re-engineering
- Move code currently in “hist” like TPrincipal, TLimit, TMultiDimFit, etc to a new directory.
- Estimated FTE: **0.2** + 0.1



# Fitting



- **Extended TVirtualFitter (must be back compatible)**
- **Functions and Fitter**
  - ◆ **New package(s): must be back compatible, possibly replace roofit**
  - ◆ **GUI must follow.**
- **Binomial Efficiency Fitter from Frank Filthaut**
- **Estimated FTE: 0.3**



# Roofit



- **not sure if we should keep it in the long term.**
  - ◆ Depends on progress with new Fitter.
  - ◆ Depends on authors willingness to answer user questions.
- **From tar file to CVS. Wouter seems OK**
- **Wouter and Kyle Cranmer designing new statistic classes (presented in January at Atlas statistics meeting)**



## 2-D Graphics



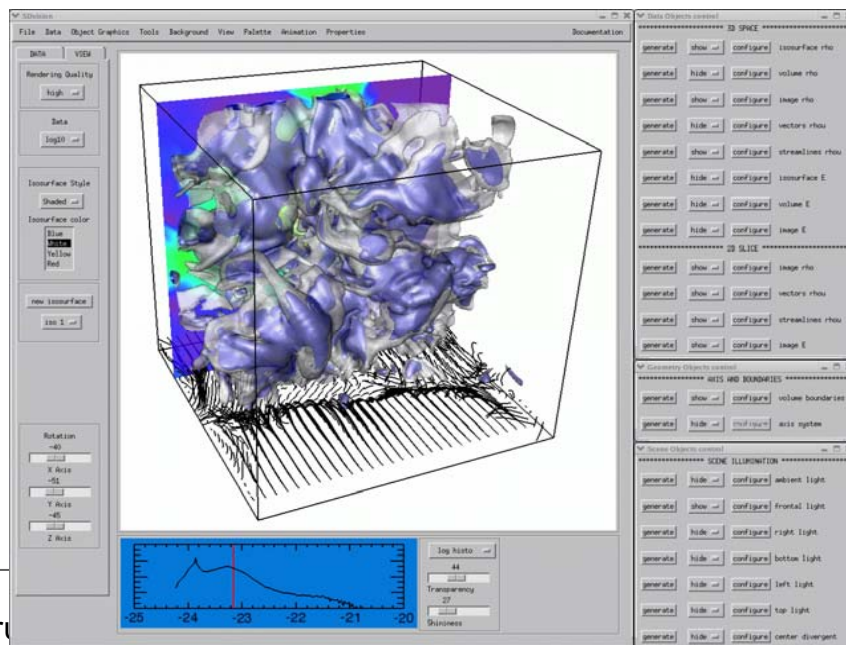
- Based on by GL (TGX11 as backup)
- No-need for TVirtualX/win32gdk (well a large fraction)
- Better integration and follow-up of libAfterImage/TASImage CVS with Sascha Vasko
- More 2-d primitives I(eg [TSpiderChart](#))
- Estimated FTE: **0.3**



# 3-D Graphics

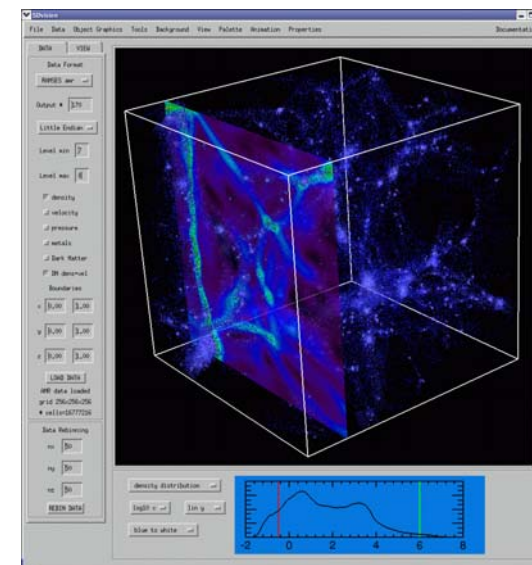


- 3-D fonts
- TGaxis3D
- Timur Work's ++
- Matevz's work ++
- More support for event displays
- New visualization techniques for 4-D and 5-D (a la IDL)
- Estimated FTE: **0.6 + 1**



R.Br

T future



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# GUI



- **More support for the builder**
- **Clipboard implementation**
  - ◆ **-> drag&drop browser->canvas**
- **List of “Option\_t options” in dialog box**
- **Help in dialogs**
- **html renderer.**
- **GL implementation**
- **TUndoManager follow-up (including all graphics editors)**
- **Developments to get the GUI in a web browser (Valeriy ??)**
- **==>possibility to run ROOT from a web browser.**
- **Estimated FTE: 1.2**



# Geom/vmc/g4root



- Restructure **TGeoManager** to avoid full recompilations whenever a geom class changes (not only forward declarations)
- More profiling and a better test suite.
- Geometry algorithms must be well documented
- Improve g4->root communication
  - ◆ -cint/reflex dictionaries for G4 -> interpreters and i/O
  - ◆ -use ROOT GUI for G4 visualization (geom, tracks, process control,...)
  - ◆ -optimize TGeo interface
- Estimated FTE: **0.1 + 0.6**



# THtml



- Possibility to run scripts while running THtml to produce gif/png files
- Start from Persistent Reflex instead of dicts in shared libs, such that it is easier to generate html when the shared lib is not available, eg when running THtml on Linux and wants to generate html for Windows classes.
- Generate **help.root** file automatically. **help.root** used by the HELP system in the command line/browser/canvas.
- Generate tag file for doxygen
- Estimated FTE: **0.1**





# Tutorials



- **Add “Getting Started” subdirectory**
- **Add “Course1, 2,3, etc” (using CSC07 material)**
- **Generate automatically the web pages for the tutorials like we do for the code.**



## Web pages & doc



- **Substantial update required**
- **Wiki, CVS, the long saga**
- **Estimated FTE: 0.3**



# BOOT



- **BOOT will require important developments and some restructuring of the ROOT libs**
  - ◆ **New technical student Diego Marcos starting in January**
- **I consider this project absolutely fundamental for the future of ROOT but also for HEP software in general.**
- **Estimated FTE: 2**