rootpy & root_numpy *in scikit-hep*

github.com/rootpy

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Previous DIANA-HEP talk:
indico.cern.ch/event/567552

rootpy

rootpy.org (GPL but next release will be BSD)

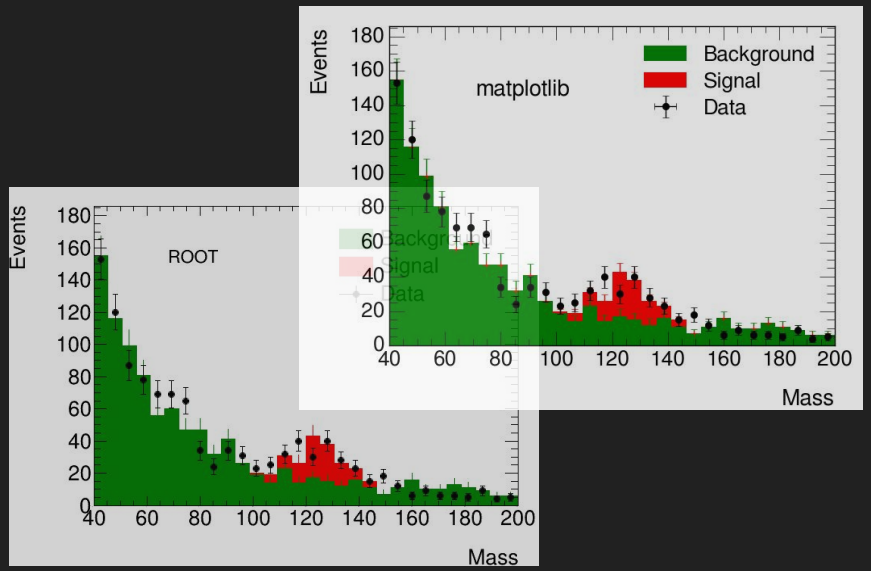
Pythonic ROOT interface on top of PyROOT
Trees, Histograms, Graphs, Files, RooStats, …
Enhanced logging and exception handling
Conversion of ROOT format to HDF5
Matplotlib interface

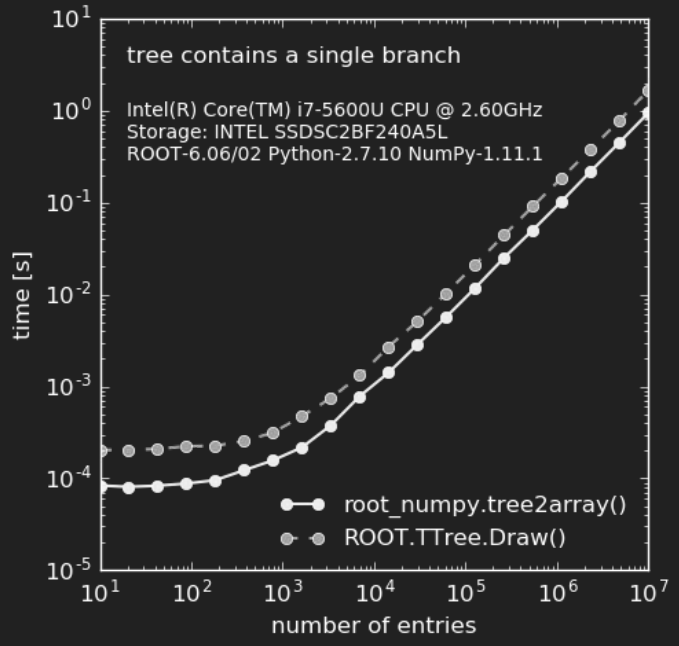
root_numpy

rootpy.github.io/root_numpy (BSD)

Low-level interface between ROOT and numpy
Fast conversion between trees and arrays
Conversion between arrays and histograms
Sampling/evaluating ROOT functions etc.
Interface between numpy and TMVA
Other utilities...

Large user base across many experiments

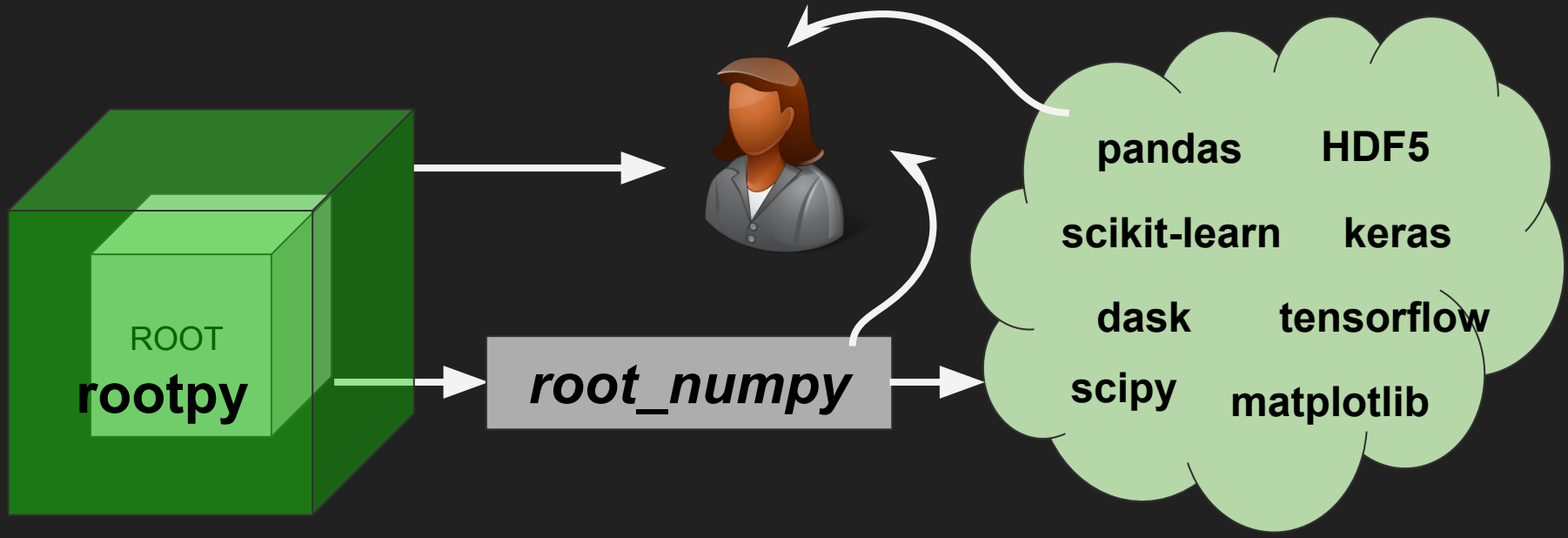


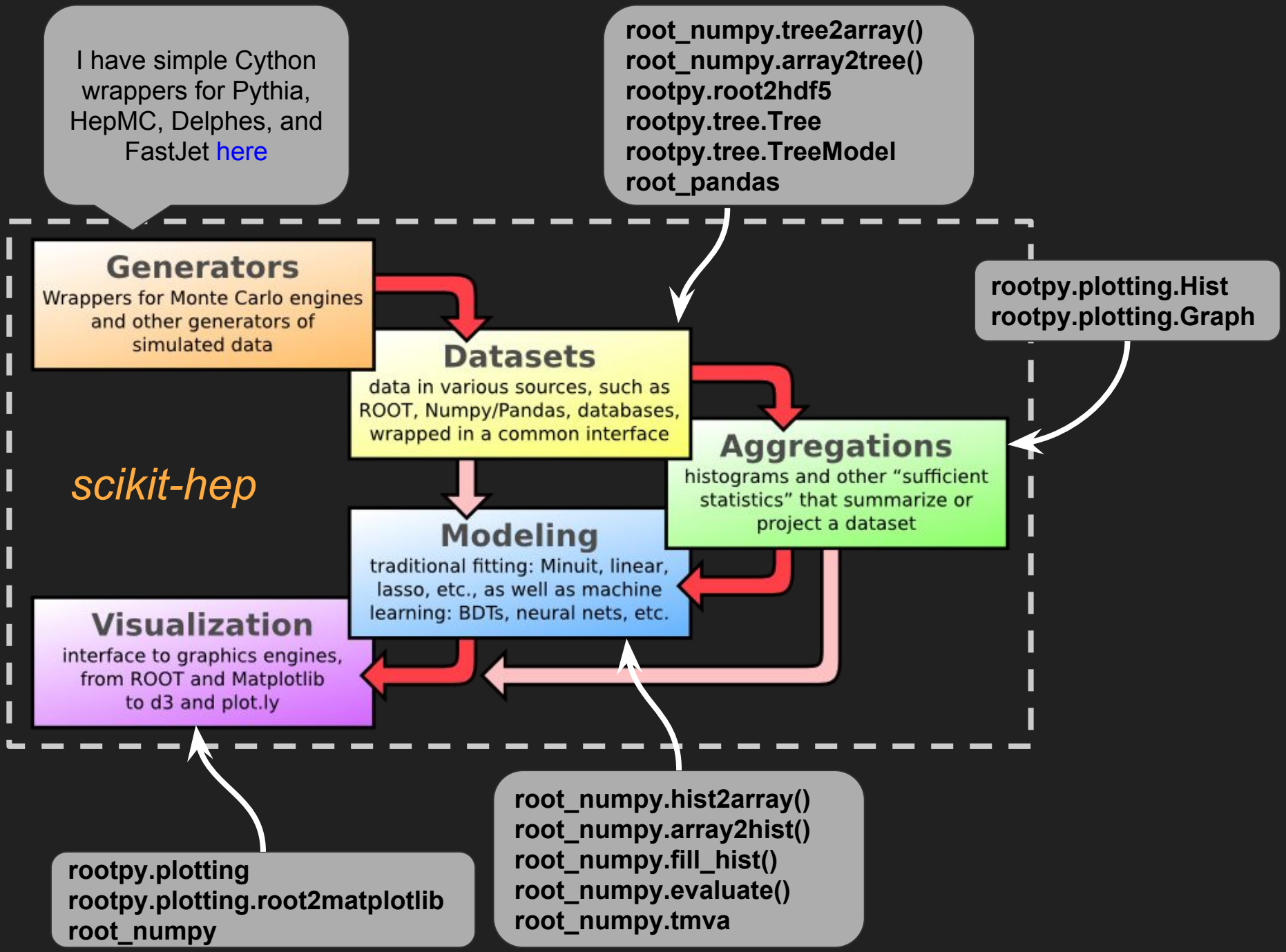


rootpy & root_numpy in scikit-hep

rootpy is useful when exposing a ROOT object to a user (use rootpy subclass), when interfacing ROOT with matplotlib, converting to HDF5, or generally dealing with ROOT in a more pythonic way (memory management, logging, exceptions, context management, descriptors)

root_numpy is useful when you need to interface with a tool that “speaks” numpy, or to perform operations more efficiently with a (temporary) numpy array




I have simple Cython wrappers for Pythia, HepMC, Delphes, and FastJet here
root_numpy.tree2array()
root_numpy.array2tree()
rootpy.root2hdf5
rootpy.tree.Tree
rootpy.tree.TreeModel
root_pandas
Generators
Wrappers for Monte Carlo engines and other generators of simulated data
Datasets
data in various sources, such as ROOT, Numpy/Pandas, databases, wrapped in a common interface
rootpy.plotting.Hist
rootpy.plotting.Graph
Aggregations
histograms and other "sufficient statistics" that summarize or project a dataset
scikit-hep
Modeling
traditional fitting: Minuit, linear, lasso, etc., as well as machine learning: BDTs, neural nets, etc.
Visualization
interface to graphics engines, from ROOT and Matplotlib to d3 and plot.ly
root_numpy.hist2array()
root_numpy.array2hist()
root_numpy.fill_hist()
root_numpy.evaluate()
root_numpy.tmva
rootpy.plotting
rootpy.plotting.root2matplotlib
root_numpy

Plans

root_numpy will remain a separate low-level package. It already has many users so would be too disruptive to kill it while moving components and new development into scikit-hep. It serves one purpose very well!
We can, however, move root_numpy under the scikit-hep github collaboration.

rootpy 1.0 will be the last major release (and under BSD). Components will be uprooted and replanted within scikit-hep as needed.