



RootSpy

RootSpy

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Motivation

- The ability to copy a histogram from one running processes to another is a useful feature:
 - Right now while developing code
 - This allows one to “spy” on histograms as they are filled so that the process can be killed if a problem is detected or sufficient statistics are obtained
 - In the future for online monitoring programs
 - Multiple nodes can be used and similar histograms gathered and merged for display in a single location



Part of 12GeV project

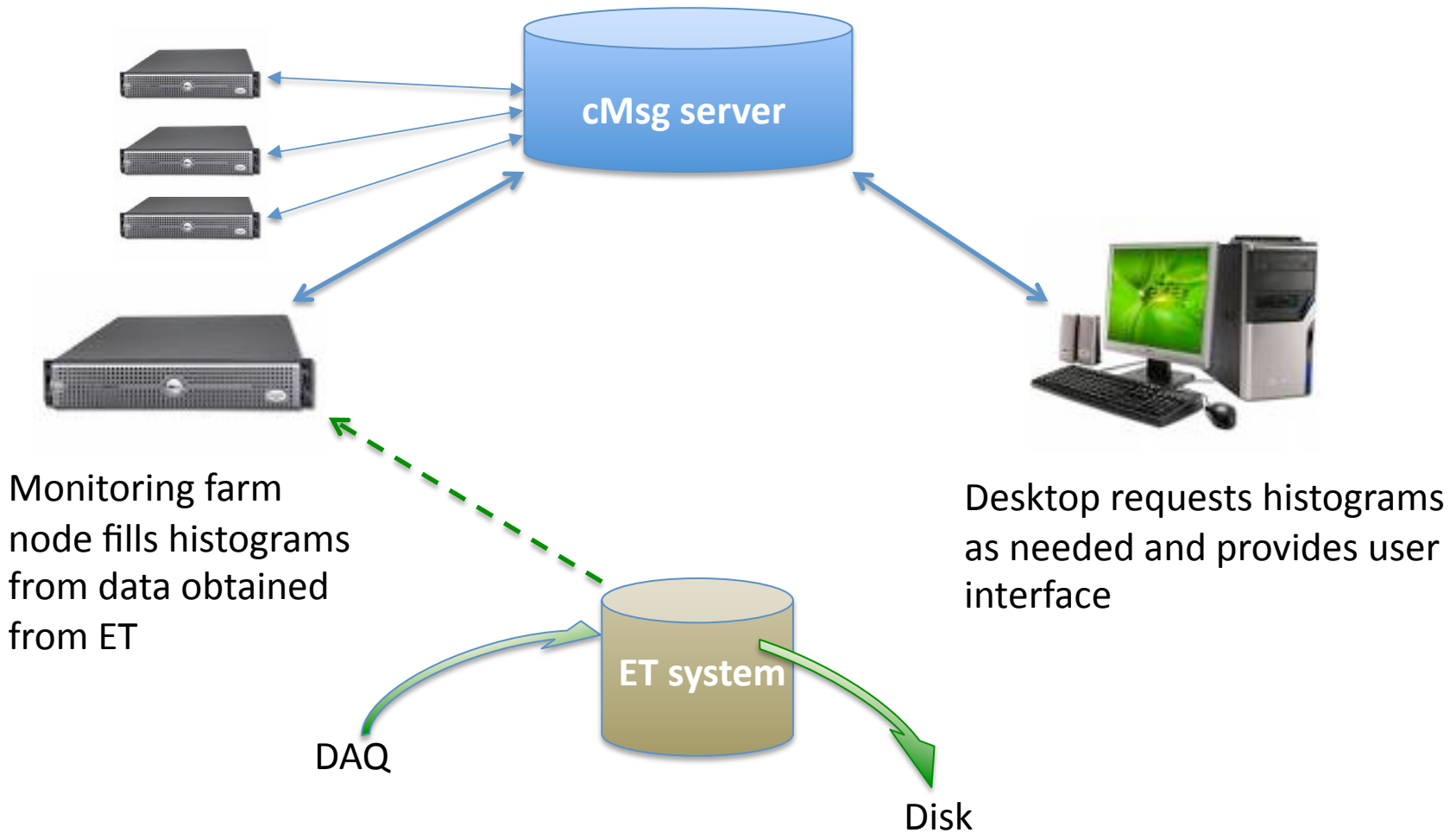
- Line 1532035
 - *Plan Monitoring*
 - 22 labor units
 - July 2011- Jun 2012
- Line 1532080
 - *Write Monitoring*
 - 55 labor units
 - Jun 2012 – May 2013



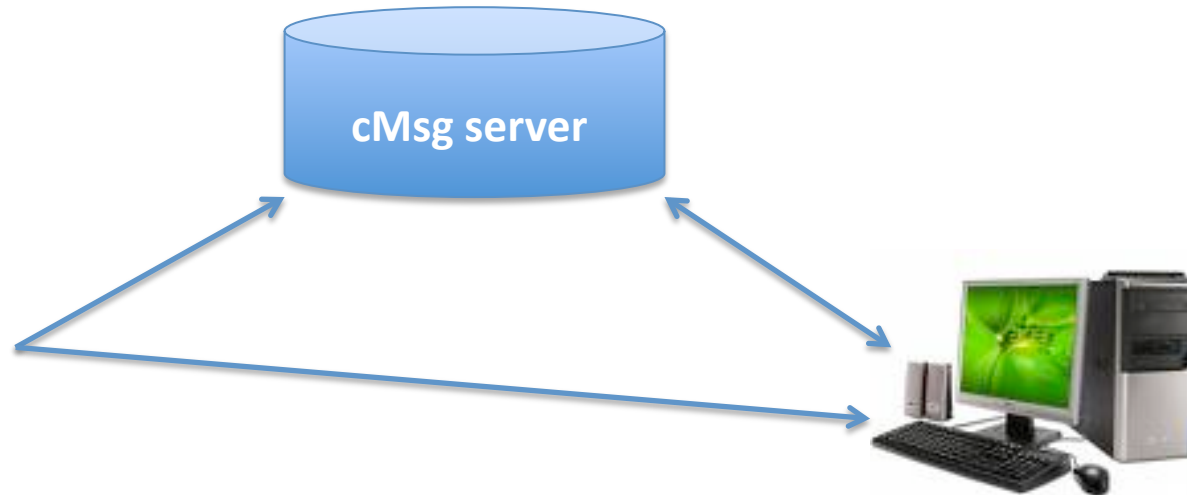
ROOT + cMsg

- ROOT is the current standard for histograms
 - Create/Fill/Store
 - Display
 - Fit functions
 - Serialize/Deserialize
- cMsg is JLab's publish/subscribe messaging package
 - Network enabled
 - Will be deployed as part of DAQ and online systems
 - Local expertise

Online Monitoring



Offline Spying



All pieces can run on the same desktop/
laptop requiring very little CPU

Desktop requests histograms
as needed and provides user
interface

General Notes

- Publish/subscribe messaging is the right model for dynamic monitoring
 - No blocking (GUI stays responsive)
 - Occasional ignored/missed message is not a show stopper
 - Callbacks mean the program spends most of the time asleep so it doesn't hog CPU
- ROOT can be accessed non-intrusively
 - ROOT histograms and directories inherit from TNamed and so can be searched for via name within the process
 - Database of object names/pointers is accessible through global memory so special coding is not needed on producer side to declare histograms or make them available

ROOT Object serialization



- ROOT objects can be serialized or deserialized using facilities within ROOT ... but a trick is required...
 - First reported by Elliott at July 29th Offline meeting (also supplied detailed HOWTO on online wiki page)
 - (De)Serialization is done via TMessage class
 - Deserialization is done via a *protected* method so one must use a “wrapper” class to call it (that’s the trick)

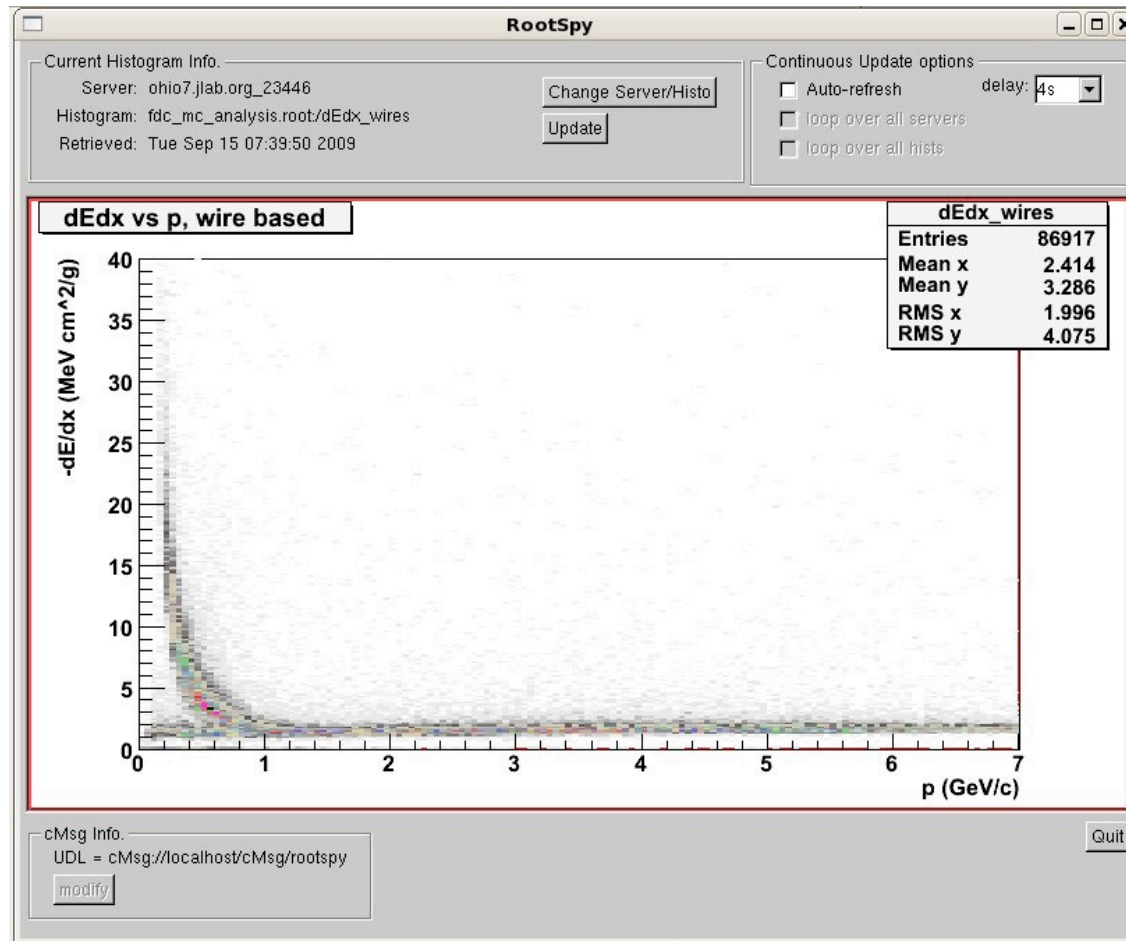
Demo?



Availability

- Lives in the 12GeV subversion repository next to JANA (but independent of JANA)
 - <https://phys12svn.jlab.org/repos/RootSpy>
- Requires ROOT and cMsg only
- Build done using autoconf/automake
 - ./configure
 - make
 - make install
- Beta testing underway and more documentation is needed

Simon Spies on dE/dx plot

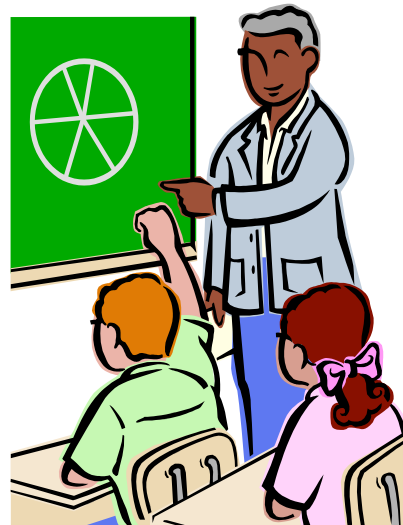


Future for RootSpy

- RootSpy lacks a lot of features one would ultimately like to have. The plan is to have these filled in using student labor.
 - Histogram adding from multiple servers
 - TTree cuts (send cut, get back histo)
 - Test w/ multiple (>10) servers (DAQ farm?)
 - Save configuration
 - “Send Final” option
 - Archiver program
 - Thread safety
 - Documentation



Backup Slides



Select individual histograms

