OPAL DP Status Update

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About OPAL

- OPAL was one of the 4 LEP experiments
- Data taken 1989 to 2000
- e+e- collisions 90 to 209 GeV
  - Precision electroweak measurements
  - QCD physics
  - Searches

The Data

- Data is stored in EOS
  - Raw data
  - Reconstructed data of various ‘densities’
    - Did not use separate physics ‘streams’
    - Used ‘Direct Access Lists’ for fast access per analysis type
  - Monte Carlo samples
    - Including 4-vector files
      - In EBCDIC
  - Some Ntuples

The Software

- Reconstruction, simulation and analysis software written in FORTRAN
  - Use the same framework for building executables
- Always developed and run on a variety of platforms
  - Avoided non-standard extensions
  - But even FORTAN compilers get more and more strict
- Central analysis packages common to many analyses preserved
  - Most of “private” analysis code lost
- Code for preparing calibration lost
- Environment based on and build around AFS
  - Including websites

The Software – a look back

- Strong dependence on CERNLIB
  - ZEBRA for access to data structures
  - HBOOK / PAW for histogramming
  - Mathematical functions
  - Geometry
  - Geant3 for simulation
  - ypatchy for preprocessing
- One commercial library used for graphics
  - Not available for recent OS
  - Dropped support for event display :(

Main Worries at 3rd DPHEP Workshop

- CERNLIB no longer supported
- Future of 32 bit compilers & libraries
  - ZEBRA working on 64 bit?
- No version of commercial library used for graphics on recent OS
  - Dropped support for event display :(

The Software – where we stand now

- Sources now stored in gitlab.cern.ch/opal
  - Sources of detector reconstruction and common analysis packages
    - Including a large part of the history of these
  - Scripts and wrappers
  - Manuals and documentation
  - Using gitlab CI features for building and basic tests
- Community CERNLIB used
- Trying hard to keep software working on recent architectures & OS
- Now building 64 bit versions
- Libraries, executables, scripts and metadata in CVMFS

CERNLIB

- Community CERNLIB used
  - Tested on various architectures and OS versions
  - Including 64 bit versions
  - Skipped 32 bit CC7, could not read data files
- Our validation still very basic
  - Compare verbose log files
  - Compare histograms
    - Not yet automated
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The Event Display

- Event display has be resurrected
  - required extensions of Openphigs
- See presentation by U.Schwickerath

The Websites

- Dedicated sites for
  - OPALists
  - Particle Physicists
  - General Public
- Webpages migrated from AFS to EOS
  - Needed to reorganize after various migrations
  - Some links still need corrections
  - Some services don’t exist any more
    - More cleanup needed

Open Data

- So far the OPAL data is not open
  - Interested users contact the OPAL Long Term Editorial Board
  - Users should collaborate with former OPAL member
  - See https://opal.web.cern.ch/of.pdf
- Discussion has started to make the OPAL data open
  - Feedback so far very positive
  - Will profit from DELPHIs experience with the process

Status Update

- CI pipelines added to gitlab repo
  - Big thanks to Ulrich!
  - Libs of central packages build automatically
    - Artifacts saved
  - Some example jobs build and run
    - Logs compared to reference logs
  - Further binaries build
  - Allows for easier and quicker deployment
    - ...and checks of new architectures, cernlib versions,...

Architectures Available in CVMFS

- aarch64el8
- aarch64el9
- amd32el8
- amd64debian12
- amd64el8
- amd64el9
- Amd64ubuntu20
- amd64ubuntu22
- Thanks to resurrected CERNLIB versions for these architectures!

Further Architectures Tested

- aarch64ubuntu20
- aarch64ubuntu22
- aarch64ubuntu24
- aarch64darwin22
- Thanks to resurrected CERNLIB versions for these architectures!

Other Issues

- Processing old latex documents can be trickier than expected
  - Some stylefiles missing
    - Eg lepnote.sty
  - Latex2html completely changed
- No more filecatalog for our data
  - How do we know data on EOS is complete?
  - Still possible to extract metadata from FATMEN catalogs?
  - What to use?

AOB

- **Interesting use of OPAL data / event display:**

  The OPAL Masterclass

  “identify for yourself some interesting particle physics interactions”

  https://opal-masterclass.web.cern.ch/

home.cern