Data Preservation at DESY.

Update from the DESY-DPHEP Group

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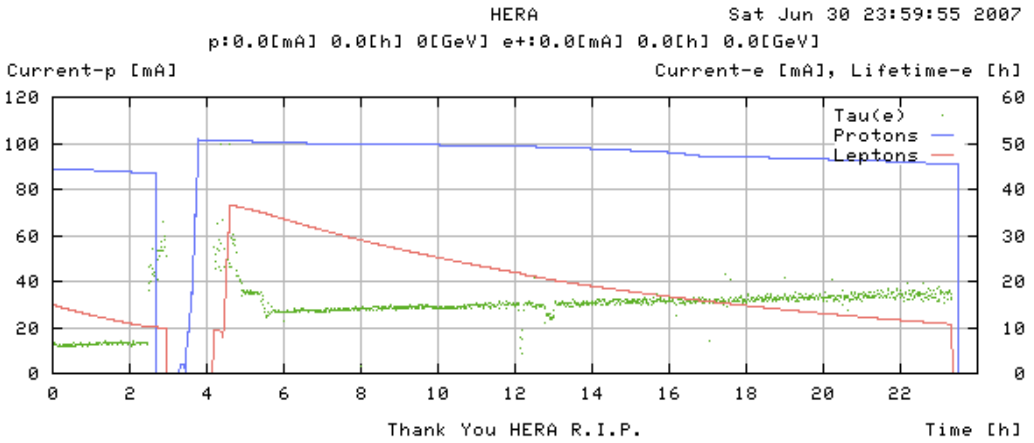
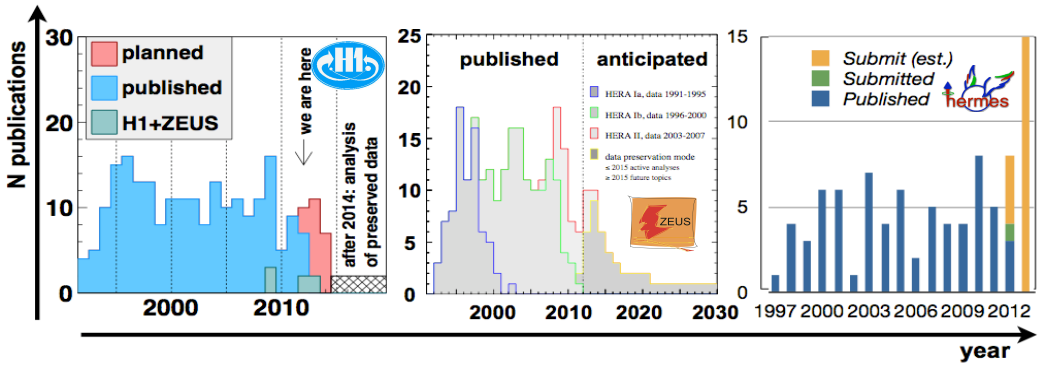
FNAL-DESY-SLAC DPHEP Workshop
Fermilab, 28th March 2014

The end of data taking at HERA: June 30th 2007

- Unique period of time in HEP history: change from many running experiments of various types to essentially only one
- HERA, stopped taking data 6.5 years ago – so what's happened since then?
- Much like LEP before us and seen by BaBar, publications still continue well after data taking: *~25% of total so far!*
  - H1: 55 papers since June 2007, out of a total of 218
  - ZEUS: 64 out of a total of 241





DPHEP activity at DESY since 2008

- The first few years after data taking: 2008-2010
  - Formation of initial ideas, first DPHEP workshops
  - Grand surveys done: data, hardware, software, technologies
  - Establishing the physics case for data preservation
  - Defining the DHPEP preservation levels: HERA experiments plan for level 3-4
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- Key areas of activity at DESY since 2011
  1. Preparation of the data for preservation and archival storage of the data themselves
  2. Data preservation: really preservation of software + environment: the `sp-system`
  3. Documentation: INSPIRE, digital meta-data and non-digital material
  4. Governance, future collaboration structures and open access/public data, outreach

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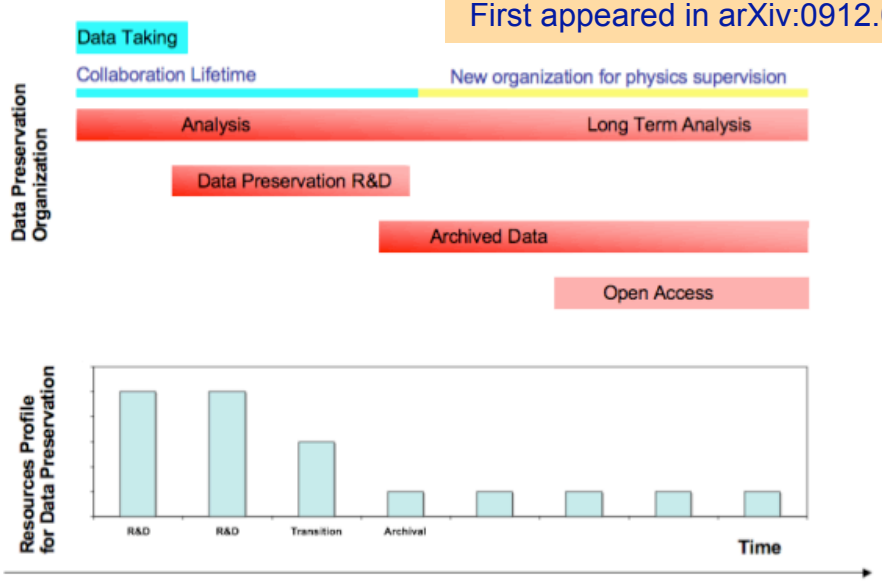
- Some things have been completed, typically well defined tasks such as the documentation (rather specialised person-power), other things still on going, including final preparation of archival data storage

The DESY-DPHEP Group

First appeared in arXiv:0912.0255

- During first years, regularly more than a dozen people involved
- Group made up of people from H1, ZEUS and HERMES as well as DESY-IT and DESY-Library
  - The available person-power has declined, in line with the model presented in the first DPHEP publication
  - 2014: There are now only a couple of people involved at DESY



- Initial person-power estimates included provision for support in 2014 and beyond

		2011	2012	2013	Translates into Position	2014++
DESY-IT	Validation	1.0		0.5	3 year FTE 2011 – 2013	(0.5)
	Storage		1.0	0.5		
H1	Validation	0.5	1.0	0.5	2 year extention for 2011 – 2013	(0.5)
	Documentation	0.5	0.5		1 year extention for 2012	
ZEUS	Validation	0.5	1.0	0.5	(Initial) 2 year FTE 2011 – 2013	(0.5)
	Documentation	0.5	0.5		1 year FTE 2011 – 2012	
HERMES	Validation			0.5	0.5 year extention for 2013	(0.5)
	Documentation	0.5	0.5		1 year FTE 2011 – 2012	

- Long term support has proven difficult to secure, especially when trying to find the right people for the job
- All current DP person-power for the experiments runs out **this year**

Key area 1: Data for preservation and archival storage

- Deciding which data (and MC) are needed for the long term depends on the preservation model assumed: Level 4 goes back to the raw data
- Final production of HERA data for preservation only completed last year; majority of MC production expected to be concluded this year
- Estimates for final **DPHEP dataset** volume ready (including MC samples)
  - Plan calls for two tape copies and an "always online" (disk) component
  - Data which should be archived, but not online all the time: re-pack into larger files
  - Costs not prohibitive on data volume basis

Expt	Online (TB)	Total (TB)
H1	250	500
ZEUS	250	250
HERMES	100	300
Total	**600**	**1050**
HERA-B	?	300

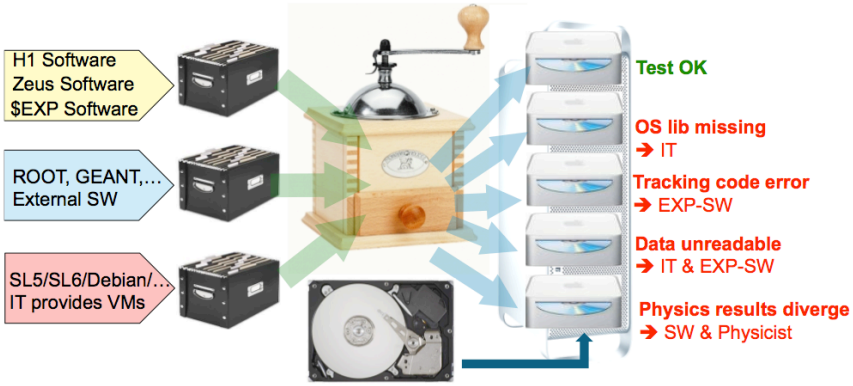
Different strategies visible

- Dedicated system too costly in both hardware and support required
  - All collaborations use dCache for mass storage and this system will continue at DESY-IT for the LHC, photon-physics and others. Natural solution for DPHEP dataset
  - Changes "transparent" for user, relying on work by DESY-IT

Key area 2: Software preservation & validation: `sp-system`

Write up: arXiv:1310.7814

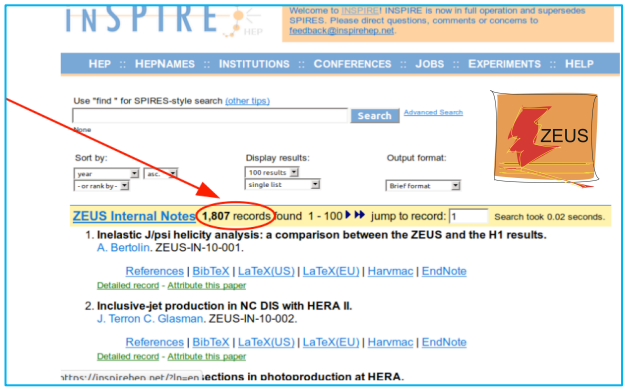
- Fairly early on, HERA experiments decided to try to migrate software for as long as possible rather than freezing the current environment
- Pilot project of a system for software preservation and validation in 2010

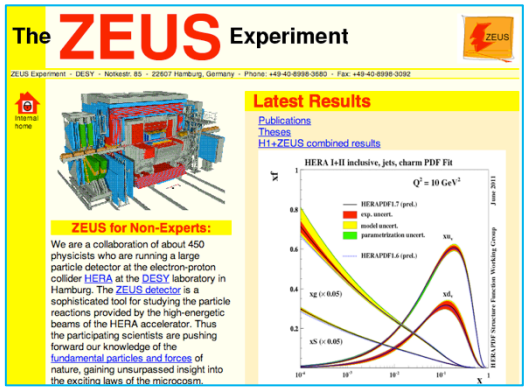


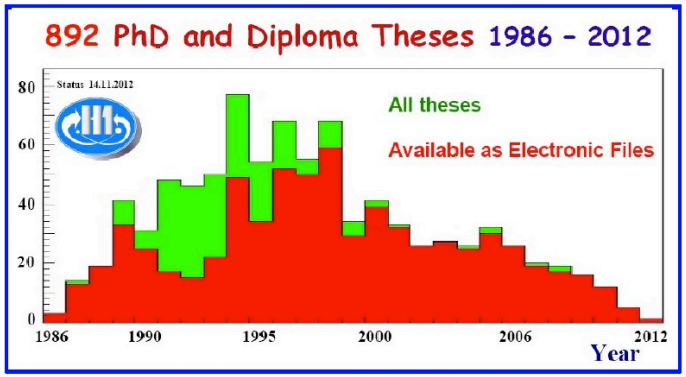
- *Briefly*: The idea of the `sp-system` is to help perform migrations to newer software versions and environments, where transitions are performed often and validated by a comprehensive set of tests provided by the expts
  - The output of such a system is a **recipe** for deployment on (future) external resource(s)
  - Future analysis resources maybe local batch farm, grid, cloud, whatever
  - *The idea is **not** to run analysis within the system itself!*
- Due to available resources and changes in personnel, implementation at DESY is still not in production mode
  - Project is rather ambitious and has taken longer than anticipated: definition of tests essentially done, but still requires much work to be done on the validation side

Key area 3: Documentation

- Successful collaboration between **INSPIRE**, the experiments and the DESY Library
- **Digital documentation** such as web-pages revised, reduced and streamlined for future use
- Lots of effort done sorting the vast amount of **non-digital documentation**
- Work done by key people with the *right expertise* and *experience* for the job

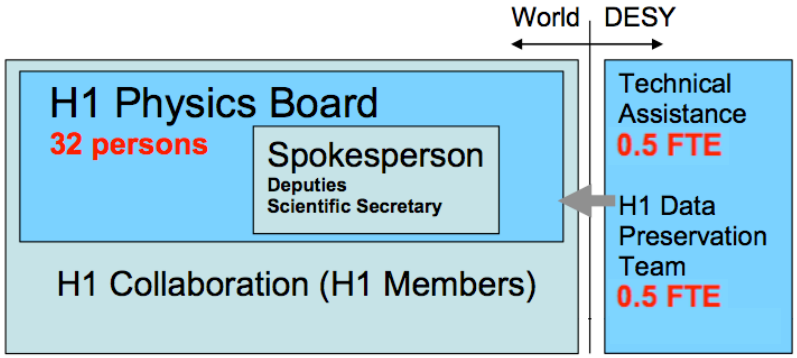




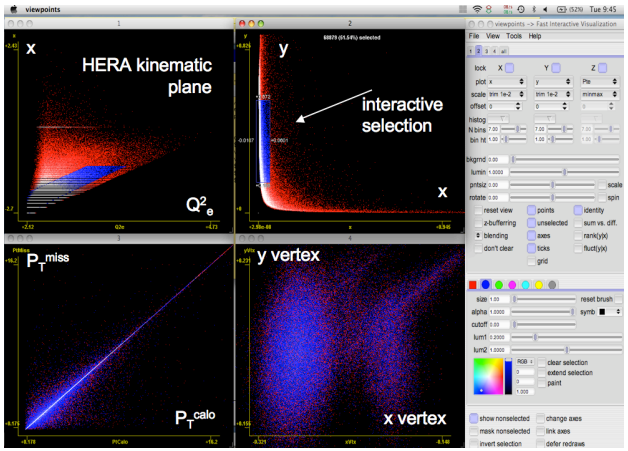


Key area 4: Governance, open access and outreach

- H1 collaboration moved to a **new management model** in July 2012
  - Formation of ***H1 Physics Board***, to replace Collaboration Board (institute based)
  - Future author list policies also set down in new constitution approved by collaboration



- ZEUS and HERMES management teams retain same model as before, but similarly to H1 the collaborating institute layer is now removed
  - Remaining physics ZEUS working groups consolidated to a single physics group
- **Open access** still to be considered and/or defined by the HERA experiments
- **Outreach** is a great idea, but was not possible without dedicated resources
  - Already dropped in 2011 table shown earlier
  - Ideas existed, but nothing concrete came of it



In summary: how are we doing?

- Key Area 1: Data for preservation and archival storage
  - Activity on-going, DPHEP data expected to be on new, long term data storage by the summer, and in use by the end of the year
- Key Area 2: Software preservation & validation: `sp-system`
  - Still much to be done, will be difficult in 2015 without dedicated person-power in the experiments. However, a **new position** will begin in DESY-IT in May for an (initial) 2 years
- Key Area 3: Documentation
  - This is pretty much concluded now, final discussions on future model of webpages
- Key Area 4: Governance, open access and outreach
  - Here not much concrete has happened at all..
- A lesson from HERMES: Financial support officially ended December 31st, 2012
  - In 2012 they tried to finish off as much as possible, physics results and data preservation
  - Hardware turn-off and transfer to DESY-IT central services completed; Validation project within `sp-system` not really implemented
  - Current situation: no dedicated manpower for any HERMES activities; the same will apply to H1 and ZEUS, at least for data preservation, at the end of 2014

DESY

Conclusions from DPHEP 8 Workshop at CERN in January: Some lessons learned from Data Preservation @ DESY

- The **physics output** tail seen by LEP also rings true for the experiments at HERA, where there is much physics output in the years after data taking stopped
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  - Losing the best people for the best roles is almost inevitable and finding support for unfinished things is extremely difficult. Difficult to capture the best candidates without providing a **long term perspective**, the need for which despite established physics cases, has been **difficult to convince people of**

How could DESY, FNAL and SLAC cooperate (more)?

- DPHEP is now run from CERN and the focus is on the LHC experiments now, who have (more) time
  - It seems to be the majority of any funding secured will also flow in this direction
  - How can DESY, FNAL and SLAC still contribute?
  - We were of course the main contributors to the 2012 paper..
  - Do we want to write up lessons learned / experience gained in HEP data preservation?
- The DPHEP Collaboration agreement will help us stay involved
  - DESY is now in the final part of the signing procedure, this will happen very soon
  - Can we at least update contact names and/or propose signatories for FNAL and SLAC?
- Then what about *real collaboration*?
  - Do other experiments want to get involved in validation systems? (LHC also looking..)
  - And what else might be possible?