



# ZEUS Computing Board Report

## Zeus Executive Meeting

**Wesley H. Smith, *University of Wisconsin***  
**on behalf of the ZEUS Computing Board:**

### Membership:

- **The offline coordination team**

- Analysis software & MC: A Geiser
- Reconstruction, code mgmt & data base: U. Stoesslein
- User support and infrastructure: K. Wrona

- **Five external members**

- J. Ferrando, T. Haas, M. Kuze, R. Mankel, W. Smith (Ch.)

### First Meeting: February 27, 2006

**This talk is available on:**

**[http://www.hep.wisc.edu/wsmith/zeus/smith\\_compute\\_feb06.pdf](http://www.hep.wisc.edu/wsmith/zeus/smith_compute_feb06.pdf)**



# ZCB Mandate

**ZCB will normally meet 3 times a year to coincide with the ZEUS collaboration meetings.**

**ZCB is charged with the following:**

- **Review the current status and short term planning of ZEUS offline. Recommend changes and new initiatives where necessary.**
- **Review the progress of the medium term planning as outlined in ZEUS-note 03-024 (ZEUS Computing Strategy: an update for years 2004-2007). Recommend changes and new initiatives where necessary.**
- **Towards the end of 2006, formulate a plan for computing beyond 2007.**

**ZCB Chair reports to ZEUS executive session at the ZEUS collaboration meetings.**



# ZCB Planning

**Decide that the first step is to establish the context by which the present activities and future plans can be evaluated.**

**Take a view of the long range plans and establish what steps need to be taken now to prepare ourselves for the rest of ZEUS physics.**

**Review the salient issues to understand what we need to look at in our next meetings in order to make recommendations to the ZEUS executive:**

- Present status of computing systems & resources**
- Data & MC processing**
- Long term physics analysis & file storage**

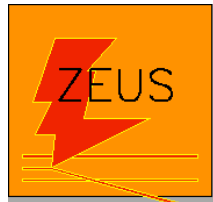


# Computing Hardware Evaluation

(info. from K. Wrona)

## Present Computing is in good shape

- **Mass storage costs are manageable**
  - Maintenance (silos, drives, servers by DESY-IT -- Zeus share) cost of 70K€
  - Cartridge cost of 60K€ for 850 cartridges for new Zeus data, assumes:
    - Long term storage of only 1 MDST version
    - restricting amount of MC (see later)
    - reprocessed data stored on recovered tapes (old MDSTs)
- **CPU capacity is adequate for analysis & reconstruction**
  - ZARAH farm: 184 CPUs in 92 dual CPU nodes
    - Including CPU upgrades planned this year to replace oldest nodes
- **Central File server has enough capacity**
  - Remove objectivity, use zeslite
  - Maintenance is 6.6K€/yr
- **Workgroup servers are presently sufficient**
  - OK if institutes continue to provide disk space and servers for their members
  - Central WG servers being reduced in number, but higher power



# Evaluate: Software, Cache, GRID

(info. from K. Wrona)

## Present SW evolution needs to continue

- **PC Farms & WG servers migrate DL5  $\Rightarrow$  SL3**
  - Widespread use & support thru 2008
- **Analysis SW migrate PAW  $\Rightarrow$  ROOT5 (ZEUS default)**
  - Good for training of students, postdocs & compatible with latest tools
  - Keep “legacy” PAW capability

## We need to invest in dCache

- **Replace old dCache servers & add more**
  - Add 36 TB using better, more cost effective hardware supported by DESY-IT.

## Increase use of GRID resources for MC & analysis

- **Plenty of GRID resources for ZEUS MC generation**
- **If shortage of analysis computing, move more analysis to the GRID**
  - First prototype analysis working on the GRID -- some analyses are appropriate
  - Not appropriate for reconstruction, reprocessing, etc.
  - Need to have a computing reserve beyond ZEUS resources alone for analysis
- **Need to maintain/enhance ZEUS operation on GRID - dynamic target!**
- **May need “deals” with ZEUS groups w/GRID resources**



# Computing Finances in the Future

**2006 ZARAH budget reduced 160K€ ⇒ 140K€ by VA'**

**Assumed 2007 budget is the same**

**Have no clue about 2008 budget and beyond**

- May be significantly reduced?**
- Need to start the discussion now...critical to planning**

**In what follows, assume as little additional funding as possible...basically just support for what we have with no enhancements.**



# Data Processing

(info. From U. Stoesslein)

## Estimate ultimate ZEUS data size

### • Start with 04/05 e<sup>-</sup> data

- TLT  $\sigma = 1 \mu\text{b}$ , 41% efficiency for 346 HERA running days @ 1 pb<sup>-1</sup>/day
- RAW 15 TB & MDST 7 TB

### • Estimate 06 data

- TLT  $\sigma = 0.75 \mu\text{b}$ , 50% efficiency for 310 HERA running days @ 1 pb<sup>-1</sup>/day
- RAW 13 TB & MDST 7 TB

### • Estimate 07 data

- TLT  $\sigma = 0.75 \mu\text{b}$ , 60% efficiency for 180 HERA running days @ 1 pb<sup>-1</sup>/day
- RAW 10 TB & MDST 4.5 TB

## Reprocessing

### • Need resources if plan to start reprocessing data as soon as possible

- Suppose start reprocessing of 06 data in summer -- keep 6 months interval max
- Allows completion of all reprocessing by end of 2007
- Implies reprocessing of 04/05 data also starting in summer 2006
- Implies greater demand on computing since reconstruction/reprocess/analyses in parallel
  - Seek additional resources for analysis from GRID

### • What about “grand reprocessing”?

- If we follow previous ZEUS timeline -- ready in middle 09 --- realistic?



# Analysis & MC

(info from A. Geiser)

## Analysis Plan Assumptions

- **MC = 5 x Data**
  - MC event records are longer than data records (30%)
- **Move to common ntuples**
  - Based on ORANGE routines “certified & stable”
  - Make analyses more efficient (common tools, systematics, etc.)
  - Not realistic to have each analysis keep own MC or own ntuples

## MC Sample Size

- **Based on available storage, limit 2006 sample to ~ 75 TB**
  - Corresponds to ~ 625 M events at 120 kb/event
  - Need to generate at ~ 12.5 M events/week -- OK on GRID

## Use of common ntuples to save resources

- **Physics groups maintain “in common”**
  - Move resources from individual ntuple sets to common ntuple sets
  - Some groups (HFL) have done this, others (QCD) not.
  - Eventually, remove need for MDST? (Size of ntuple?)
  - As a test, temporarily allocate 1TB ZEUS central resources for common ntuple