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

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 car 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 ⇒ SL3**
  - Widespread use & support thru 2008
- **Analysis SW migrate PAW ⇒ 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^- data**
  - TLT σ = 1 μb, 41% efficiency for 346 HERA running days @ 1 pb^{-1}/day
  - RAW 15 TB & MDST 7 TB
- **Estimate 06 data**
  - TLT σ = 0.75 μb, 50% efficiency for 310 HERA running days @ 1 pb^{-1}/day
  - RAW 13 TB & MDST 7 TB
- **Estimate 07 data**
  - TLT σ = 0.75 μb, 60% efficiency for 180 HERA running days @ 1 pb^{-1}/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