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**INTEROFFICE MEMORANDUM**

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**TO:** LEE SAMUEL FINN  
**FROM:** LEE SAMUEL FINN  
**SUBJECT:** PSU TIER 2 CENTER CONFIGURATION  
**DATE:** 4/22/02  
**CC:** STUART ANDERSON, KENT BLACKBURN, ALBERT LAZZARINI, TOM NASH, VIJAY AGARWALA

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In attendance:

- Stuart Anderson
  - Kent Blackburn
  - Sam Finn
  - Albert Lazzarini
  - Tom Nash
1. What functions does a tier 2 center support?
    - a. LDAS
    - b. LDAS Development
    - c. DMT
    - d. DMT Development
    - e. General Computing? Less certain on this one. Not part of data analysis in a narrow sense, but certainly part of interpretation.
  2. CPU Architecture: What architectures are projected for different components of the system?
    - a. Sparc
      - i. ManagerAPI, EventmonAPI, FrameAPI, DiskCacheAPI, Metadata, controlMon
    - b. P3/P4/Xeon:
      - i. Datacon, MPI, Wrapper
      - ii. Datacon may go to solaris/sparc
    - c. 64b Intel
      - i. Will evaluate early 2003
      - ii. Candidates include Itanium derivative (e.g., McKinley) and the 64b x86 extension by AMD
  3. Planned node configurations
    - a. Gateway: Quad solaris/sparc: 880 with 8GB. Runs ControlMonAPI, ManagerAPI, web server, software server, ftp server, grid tools and security layering. Raid disk storage (1/2 TB) for storage of ldas results.
    - b. Gateway to Beowulf: Runs MPIAPI, Wrapper master(s). This system needs to be impedance matched to datacon output data size. Quad intel.. Potentially a 64bit system (matches to datacon output). Don't need cache here (no computing on wrapper master boxes).
    - c. Beowulf:: 2GHz P4 Xeons with 512M and nominal disk
    - d. DataconAPI

- i. Current configuration is a quad intel box. In the schedule and budget the current system is replaced between S2 and S3 with quad P3 Xeon w/4GB memory; however, this will likely change to a 4-8 processor 64b processor system with 8GB.
    - e. Database Box: Runs metadataAPI, eventmonAPI and db2 server. Quad sparc/solaris box (Sun 880) with 4GB. External storage for metadata (raid) connected via fiber channel.
    - f. Dataserver: Runs frameAPI, diskcacheAPI. Quad sparc/solaris 880 with 8GB. Big raid connected here for frame data, connected via fiberchannel.
    - g. DMT: Need to talk with Zweizig about future plans for DMT.
    - h. Tape robot sits on its own server:
- 4. Interconnect
  - a. Gigabit on servers (gateways, dataserver, metadata server)
  - b. Nominally carrying fast Ethernet on Beowulf.; however, GigE NICs are less than 50\$/node. If can find a core switch that is less than about 200\$/node then will switch to GigE on the Beowulf nodes.
- 5. Mass Storage
  - a. Tape:
    - i. Need to think through data distribution model: what, exactly, does a tier 2 center need? What will it get on tape? How often? Where is the boundary between expensive and cheap drives? Tier 1 – Tier 2? Tier 2 – Tier 3?
    - ii. LIGO has identified that it needs substantial capacity beyond AIT-II at observatories. H/W identified is STK 9940B drives, at least two heads in a 700 tape robot, connected via fiber channel to server. SAMQFS (license fee, but heavily discounted by Sun in academic environment)
  - b. Spinning media
    - i. > 500GB on gateway (for ldas results)
    - ii. Metadata
      - 1. Sized by size of metadata.
      - 2. In turn depends on the distributed database model: i.e., federated databases? Mirrored database?
    - iii. Dataserver
      - 1. Sized by frame data kept on-line at any time
      - 2. Do tier 2 centers host only level 2 data? How much? Do they also host level 1 data? If so, how much?
- 6. Internet data distribution
  - a. Need to experiment moving data using grid tools to/from Caltech. This can be done with, e.g., a 2Ghz P4 at PSU running globus and sitting as close to backbone as will the tier 2 center.
- 7. Summary:
  - a. Tier 2 center is h/w heterogeneous: servers are sparc/solaris, compute engines (except possibly DMT) are intel.
  - b. Several dedicated purpose servers – gateway, Beowulf gateway, dataserver, database server, datacond, dmt – and Beowulf cluster for computing
  - c. Mostly nominal disk internal to cluster, internal to servers: most on-line storage is via fiberchannel connected raid
  - d. Tape storage is an open issue: the appropriate model for a tier 2 center is not well understood here.

- e. The iVDGL money doesn't go far enough in putting together a tier 2 center for LIGO data analysis: we will need to make this part of the ITR proposal for LIGO Data Analysis Operations.