

# Making *Grid* Computing Work for LIGO

- *grid* means distributed heterogeneous resources “*transparently\* accessible*” to scientific users.
- “*transparently accessible*” implies significant coordination of management of *resources*
- *resources* include
  - hardware
  - software
  - network
  - data
  - personnel who support all this

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\*...*well, reasonably or almost or somewhat, transparently*

# 3 Separable General Issues

- Data reduction and analysis “usage model”
  - see White Paper and further map to grid
- Identify coordinated (grid) portion of “resources”
  - hardware, software, network, people
  - explicitly identify
    - what is to be transparently available to all users
    - what is to be held back for dedicated or local use
  - early drafts of MOUs address this aspect
- Management of coordinated (grid) resources

# Management of Coordinated Resources

- Tautology: management = coordination
- Our most difficult and critical task is to turn an intrinsically uncoordinated bag of resources into a “transparently” functioning “grid”
- Intrinsic problem we must overcome: we are *dispersed*
  - Geographically *dispersed*
  - Institutionally *dispersed*
    - People are not (never will be) in a single, clear chain of command
  - Funding sources, timing, and motivations *dispersed*
  - System design and configuration planning *dispersed*
- Nonetheless we must handle this as ONE entity
  - THE Lab, THE LIGO Project, THE LSC Collaboration
  - whatever you want to call it, it is WE, not US and THEM

# Support: Demand Side Resources: hardware, software, data, network

- Development (or procurement)
  - Specify configuration
  - Installation and testing
- Upgrades and version management
  - Ports to different HW or SW platforms & configurations
  - Local installs
- Repairs and bug response
- Help desk
- Data distribution
- Resource allocation
  - Access control

# Hardware Usage

- Production computing
  - Simulation
  - Real time (e.g. stochastic)
  - Compute bound (e.g. cw)
- User service
  - Code development and rapid prototyping
    - Detector characterization
  - Fast turn around analysis of reduced data sets
- Storage
  - Large scale community data (Tier 1 and ??)
  - Reduced community data
  - Private data

# Software categories

- OS
- “Grid” tools
- Infrastructure (LDAS)
- Science tools
- Production packages specific to WGs
  - Simulation
  - Data reduction
- Individual data analysis

# Support: Supply Side Resources

- Personnel
  - LIGO Lab
  - Tier 2 Institutions
  - Contract/out source
- Data Distribution
  - Wide Area Network
    - At Tier 1
    - At Tier 2s
  - Hi Latency (FedEx)
- Archives
  - HPSS
  - Tape Copy Facility

# Our task: manage resources

- Look at where we are ...
  - ... define where we want to get
    - with a transition plan from here to there
- In terms of
  - Usage model
  - Allocation of existing supply side resources (people, net)
  - Optimizing existing systems & software configurations
    - Short term issues -- make things work, e.g. HPSS
  - Pleas (justification) for additional resources
  - Plans to allocate additional resources
    - Fall back plans to optimize with less than needed/desired resources
  - Establishment of a chain of ~~command~~ coordination
  - Rapid prototyping of management plan
    - Short term issues -- how to analyze E7, E8, ...