

# Proposal for the LIGO/GriPhyN SC 2003 Demonstration

## Friday, July 18, 2003

### Participants:

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For this year's demonstrations we will concentrate on two applications, the Pulsar Search using standalone codes and the Stochastic Search codes, which use both LDAS and generic resources. To focus our work we are targeting high-level goals for each analysis.

**Pulsar Goal:** Demonstrate science at a level never achieved before. Perform a some sky, wide sky area pulsar search on the S2 LIGO data leveraging UWM, AEI, CIT, ISI and one very large non-LSC site. The ultimate goal is to use an equivalent  $10^3$  CPUs for 1 month, and demonstrate adding another site as it becomes available. This demonstration will also be innovative in terms of "bringing everything we need" to a site (except for VDT). This implies that Pegasus will be able to stage the executable to the available sites as needed.

We assume that we will be able to use the following resources:

(CPUs): UWM: 296 CPUs, AEI: 360 CPUs, CIT: 210 CPUs, ISI: 20 CPUs, Cardiff: 120, Other possible resources could be: Miron (?) 500, LSU: 1,000, TG: 1,000, NCSA: 1,000, Grid 3: 200, PSU?, LSU?

Albert and Maria will approach the resource owners to gain access to the resources.

**Stochastic Goal:** Search all S2 LIGO data (H1, L1) including Monte Carlo injection simulations.

Resources: CIT, UWM, ISI

### CS needs:

- Pegasus (ISI team)
- Bring everything
- New A/I training
- LDAS-jobmanager (Hari and Scott)
- Peter on LDAS passwds
- LDAS&Certificates (Scott P.)
- Pacmanize MCS

### Site needs:

- VDT (Globus/condor)
- LSC GHS
- MCS

Gridmap files  
Certificates  
Accounts

**Application needs:**

SFT data: SFTs spanning 30mins of S2 data, also a file describing the SFTs, including periods of time for which the data is not available or invalid (Bruce)

Extract SFT code—code that is able to extract a frequency band from SFTs (Bruce)

ComputeFstat – same as it is now (MAP)

Catalog of parameters, command line arguments (MAP) ~200K lines—script

Stochastic Injections (Kaice)

Wrapper for Stochastic (Kaice)

Parameters for Stochastic 96K (Kaice)

Wrapper API on “generic” grid (Scott and Peter)

**Timeline:**

7/23 VDT on RH 9 investigation (Scott)

8/1 VDT installed (Stuart, Scott, Hari, Stefan, Bala, Karan))

8/1 accounts (admins), gridmap files, certificate

8/1 MCS at ISI (Karan)

8/7 LDAS job manager (Scott and Hari)

8/7 LSC GHS (ISI and somewhere else, Hari, Scott, Nosa)

8/14 ComputeFstat (Bruce)

SFTs data

Catalog of parameters—at least a start (MAP, Kaice)

Stochastic Injections (Kaice)

Wrapper (Kaice)

LDAS/GSI solution

8/21 **Limited workflow production system---**

■ begin validation

■ how-to-doc

9/1 Wrapper API on LSC resources (Scott)

9/1 Pegasus in “bring everything” mode

9/1 AI planner

9/15 **Entire workflow attempt**

--- next level validation

9/21 integrate non-LSC site

10/1 First Visualization attempt

## Appendix: Uneited notes by Peter Shawhan on Karan's Talk and ensuing discussions

SC02 demo

Intro to planning

- Chimera

- Pegasus

- SC02 demo

Planning: select resources and data sets, schedule them onto the grid,  
plan data movement

Recipe:

- Understand the request

- Locations of data products (final & intermediate)

- Location of job executables

- State of the grid

Abstract workflow vs. concrete workflow

- User requests a logical file

Chimera system generates a DAX (XML based Abstract DAG) on the basis of  
dependencies

Pegasus: a configurable system to map and execute complex workflows

- Chimera driven configuration

- Metadata driven configuration

- Currently relies on full ahead planning (later, plan to incorporate  
in-time planning)

Chimera is top level (or could be metadata)

Pegasus: concretizes it, i.e. maps it to the grid

Figures out specific resources (i.e. what Condor-G pool to use) Plan is to hook into  
Globus information services to know what resources are  
available. Right now, we require some pre-installed software, so we can  
only run on such machines.

Right now, you manually add pool info to a pool.config file which Pegasus uses In the  
future, each grid should have a directory service (e.g. one for all of LSC) - hierarchical

Right now, you can't push executables at the time you submit jobs; you have to  
install things in advance. Eventually, plan to support model of pushing  
static executables to run on the machines

Currently, Pegasus works with Condor, but it can really work with any remote  
scheduling system

Bruce's question: how many nodes are available now? Will it ever be the case  
that one can just "plug in" and have access to lots of computing resources?

Scott: there has to be some negotiation with resource providers. They  
might or might not be willing to give away resources for free.

[Tangent: "Grid 3"

- Being led by CMS and Atlas along with PPDG (Particle Phys Data Grid)

Goal is to really bring up a grid for people to use  
Need to have in place by SC03  
Plan is to keep it running after that, hopefully forever  
LIGO and SDSS are playing along, at a low level  
CMS and Atlas are putting in a huge number of FTEs

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Sample pool.config.xml file

pool handles

Need to specify work directories

Catalogs

Transformation catalog: tc.data

Maps logical transformations to physical transformations on a pool  
pool.config

Replica location service

Maps logical filenames to physical filenames

MDS

Provides up-to-date pool statistics (queues, memory, disk space, etc.)

Why use metadata approach? (Alternative to Chimera for first stage)

Current approach (Chimera) is file dependence driven

No reasoning done on the basis of the characteristic of the transformation

Not scalable

Transformation catalog has to have a separate logical filename entry  
for each part of the job, even if they're all conceptually closely  
related (e.g. SFTs from different times)

Metadata driven configuration

Pegasus uses Metadata Catalog Service (MCS)

Performs mappings between application specific... and logical filenames

AI planner

Used to construct both abstract and concrete workflows

Models application components, data transfer and data registration

SC02 setup

Resources used:

Security:

Submission interfaces, compute and data management resources were Globus GSI  
enabled

Myproxy

DOE certificates

Submission interface

SC2002: approximately 200 pulsar searches were conducted

Transformation catalog

Contains the explicit ways to do things (paths to executables, etc.)

## Planner

Can produce a lot of alternative plans

Has to be told what the operations are

Generates a plan which is concrete in the sense that it specifies a specific

Condor pool to use, etc; but doesn't know exact paths of executables, etc.