Fermilab

Computing Resource Requirements

for

The MINOS Experiment

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Version 1.1 (DRAFT)

Introduction

This document describes the computing capacity and hardware requirements for the MINOS experiment, including the Minos+ extension of Minos using the NOvA beam.
It will be reviewed yearly in preparation for the annual CS budget planning and procurement process. It is related to the MINOS MOU and the information in the "Computing requirements related to MOU" section are named accordingly.

Requirements

The experiment logged about 400 GB/year Far and 1000 GB/year Near. This data is archived to disk and two sets of tape at Fermilab. For Minos+ in the NOvA beam, Near Detector data may increase to 3 TB/year. There is a new TimeOfFlight data stream of about 2 TB/year.

MINOS has a great deal of experience with processing data and targeted estimates for computing resource needs are shown in Table 1. The hardware categories are (1) Central Disk Storage(Bluearc), (2) Tape, (3) GP Grid Farm CPU, and (4) Interactive Analysis / Batch Cluster CPU. MINOS has an allocated share of 1200 grid slots. They typically get at least 2000 and have sustained 5000 slots when busy. Data processing at GRID facilities beyond Fermilab includes all Monte Carlo production, and reconstruction of the full ND cosmic data stream. This activity can add a load on the Wide Area Network to Fermilab at the level of 1TB/day when the experiment is importing large MC sets, otherwise it is small.

Resource	2011	2012	2013	2014
DISK (TB)	160	240	290	420
TAPE (TB)	650	750	850	916
GRID (slots)	1000	1200	1200	1200
Int. Analysis (cores)	32	32	32	32

Table 1. Resource estimates for MINOS computing needs. The numbers are for "total" need each year.

Computing requirements related to MOU

Section 2.5 Databases

There are three database areas needed by the experiment

- Conditions - Beam parameters; Detector conditions, calibrations, alignment, etc.
  - This is about 100 GBytes, grows linearly with time.
- SAM - for the data file catalog. Small
- IFBEAM - an archive of NuMI beam conditions
  - operated by the REX DB Applications group,
  - shared by all NuMI experiments.

Section 2.6 Disk and tape storage

1. The primary disk working area is Bluearc. The /minos/app area is currently under 10 TB and will be greatly reduced. The /minos/data area is currently 240 TB and growing 50 TB/year. This growth will triple in FY14, in the NOvA beam era. Minos is requesting and investigating more cost effective non-Bluearc disk options for the FY14 and subsequent expansion.

2. There are 46 TB of Minos dCache pools: 14TB for raw data files and 32 TB for reading.

3. Enstore is used for archival storage only and is not involved in the operational processing and analysis of MINOS data. As of December 2012, the experiment uses about 725 TBytes, including 11 TB raw, 280 TB raw reco and 400 TB simulation data.

4. MINOS uses about 100 GB of AFS space for individual user home login areas, and about 16 GB for web pages and a few data files. The 9TB of AFS data areas served by the fsus-minos02 host are being released in early FY13.

Section 2.7 Data analysis and processing

1. For FY2013 about 1200 Fermigrid job slots are allocated to Minos. Typical peak usage is about 2000. We should be able to get 5000 opportunistic slots on occasion.

2. The experiment uses 32 cores of interactive computing. This will not increase.