DarkSide Offline Computing model and resources

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DarkSide-50kg
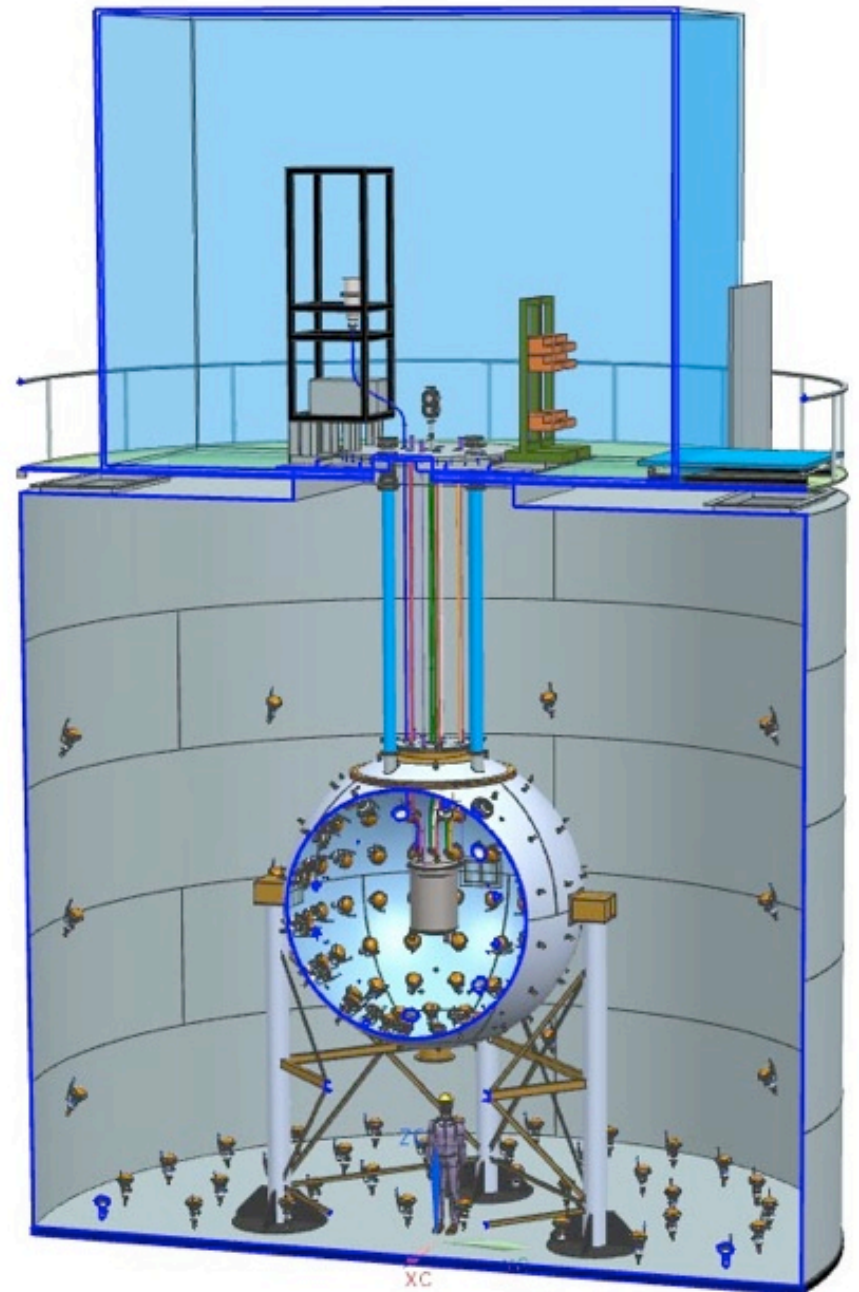
Dark Matter search:

50kg of Underground Liquid Argon

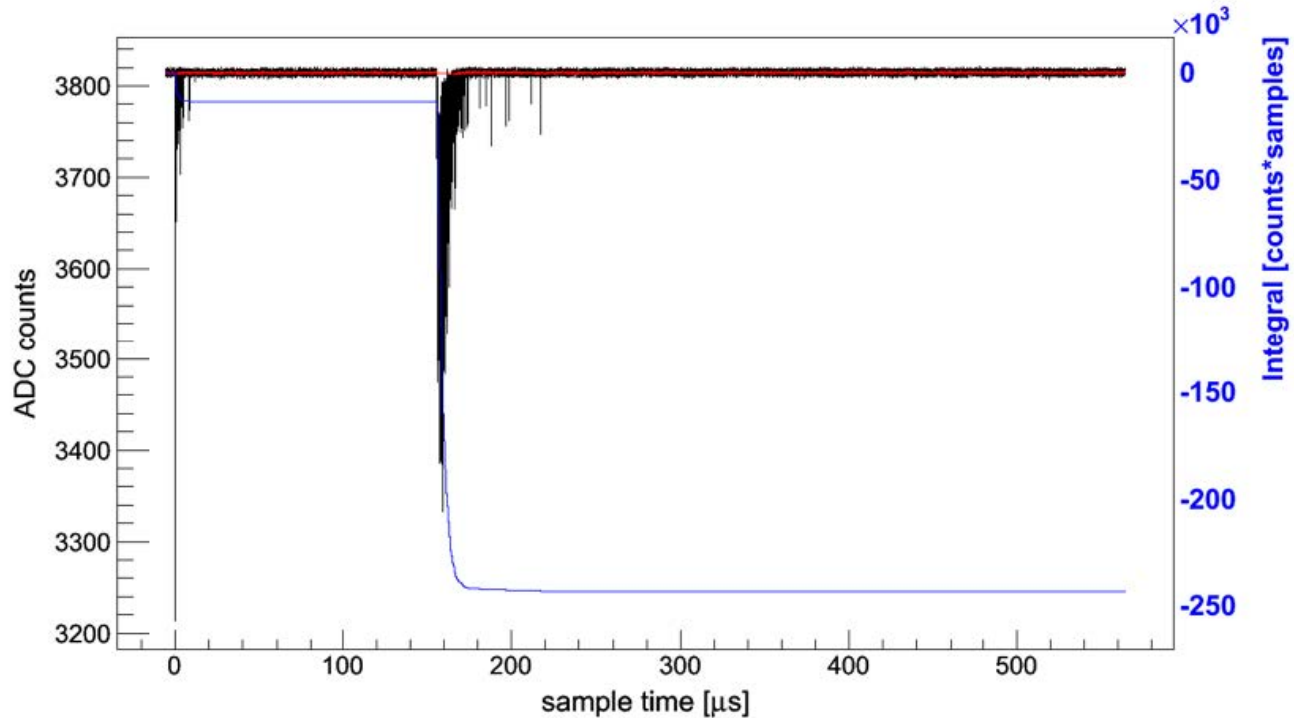 + Active scintillator veto

 + Water shielding

LNGS Hall C

DarkSide-50kg
event size and rate

250 MS/s * 40 ch * 2 bytes/sample * 440 μs = 8.4 MB → 1.67 MB compressed

50 Hz using Atmospheric Argon
about 1 Hz using Underground Argon

DarkSide-50kg

Data throughput:

Atmospheric Argon	40	TBytes/month
Underground Argon	6	TBytes/month
Laser Calibrations	1.7	TBytes/month

Required computing power:

Data analysis and Calibrations 1400 HS06 per year of data taking

MonteCarlo   50 TB   and   5000 HS06

DS-50kg Computing Model

DS-50kg has two main offline sites: LNGS and FermiLab

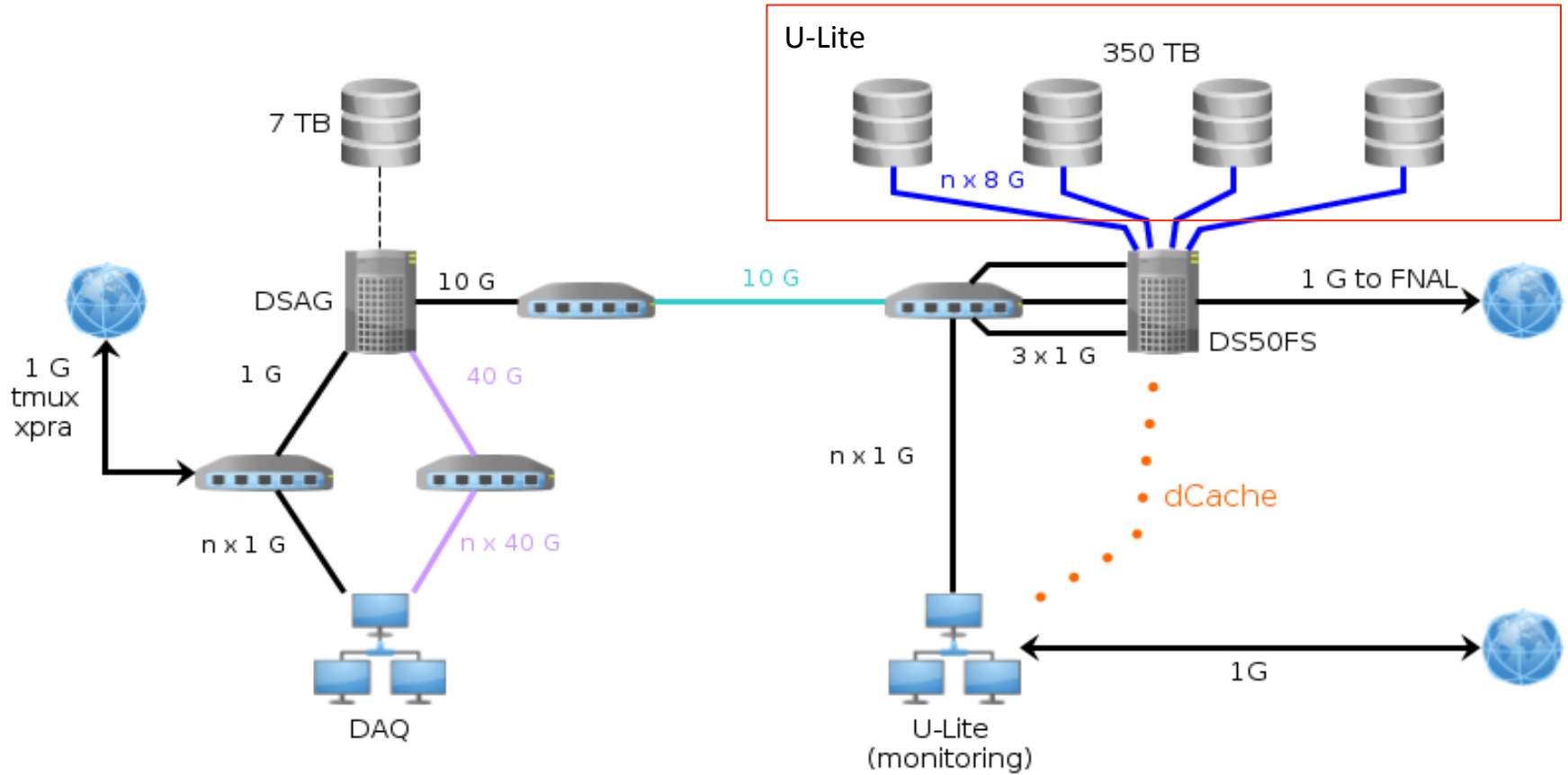DAQ transfers data to LNGS Offline Farm via a 10 Gbit optical link

Rawdata are automatically copied to FermiLab (almost in "real-time")

Both LNGS and FermiLab provide infrastructures to store and process data

Major effort in order to let collaboration members use same environment and tools on the two sides of the Ocean

DarkSide-50kg
Offline facility @ LNGS

DarkSide-50kg
Offline facility @ LNGS

ds50fs.lngs.infn.it
- raw data file server

blackhole.lngs.infn.it (visible from outside LNGS)
- NFS home directories server (76 users)
- NFS data files server
- condor central manager and cpus (6 nodes)
- web server
- database (mysql)
- electronic logbook
- automatic backup (home, web, db….)

andromeda.lngs.infn.it (visible from outside LNGS)
- Backup server
- condor cpus (6 nodes)

whitestar, prometeo, minerva (internal LNGS network)
- condor cpus (6 nodes each)
- LTO5 tape backup

FermiLab offline resources

Computing: GPCF General Physics Computing Facility

Disk space: BlueArc storage

Job queue management & GRID: FermiGrid (up to 1000 cores)

Software repository: GIT (Redmine)

Fermilab's Offline Role

- Repository for software , documentation, and data
- git repository for art, darkart, artdaq, ds50daq, …
- Documentation: docdb exists at FNAL for analysis notes, technical documents, proposals, HOWTOs, …
- Transferring all raw data to FNAL for reconstruction
  - \>110 TB transferred so far; speed can be an issue at times
  - Sometimes it's fine

| rw-stkendca12a-1 | ds50test.lngs.infn.it | Mover rw-stkendca12a-1/50331678: Receiving | 00:01:43 | RUNNING | 5204169 | 50188 |
| rw-stkendca15a-1 | ds50test.lngs.infn.it | Mover rw-stkendca15a-1/50331665: Receiving | 00:00:31 | RUNNING | 1404464 | 45088 |

Speed in KB/s

Slide from K.Herner (FNAL)

Offline resources and tools
Prospects

Both LNGS and FermiLab provide infrastructures to store and process data

- Optimize/find resources for European-side event analysis
- Increase/stabilize LNGS to FNAL transfer speed

Major effort in order to let collaboration members use same environment and tools on the two sides of the Ocean

CVMFS(CERN), SAM(FNAL), Cloud…..

Thank you