

Plans for Data Challenge 4: Introduction

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Two Parts to Data Challenge

- Phase 1: Data Pipeline Test:
 - From Experimental Hall EHN-1 to CERN Public EOS to Fermilab
 - Current schedule June 13-17
 - Will discuss that in this section
- Phase 2: Distributed Processing Test:
 - Testing processing of data with the new workflow manager tools
 - No current schedule yet
 - Will be discussed in next session
- **GOALS FOR THIS MEETING**
 - Identify information we need from other groups to plan joint sessions @ Collaboration meeting
 - Get decisions on key decision points
 - Show the critical path items and where effort is needed

Project Plan

- <https://github.com/orgs/DUNE/projects/4/views/1>
- Scope document:
https://docs.google.com/document/d/1dtFxDV7RwU2RGSQkR5xJqWDC-bkLTTuE-FDt9v74_pl/edit
- 6 defined milestones (two initial dates already past)
- [Goals and Scope of Data Challenge Finalized](#) (April 25)
- [Component Functionality Testing Completed.](#) (May 2)
- [Benchmarking testing completed](#) (May 16)
- [Data Processing Final Component Selection](#) (May 31)
- [Data Pipeline Final Component Selection](#)(May 31)
- [Start of Data Challenge](#)(June 13 for phase 1)

How Much Data and How Fast

- Demonstrate sustained bandwidth of 10Gbit/s DC from EHN-1 to CERN data center to Fermilab for 1 week (5 working days) [This will be $\sim 1/2$ PB]
- Try to get a burst of 40Gbit/s DC if possible near the end
- 100TB / 4 GB = 25000 files a day!
- **INFORMATION NEEDED:** Is this rate enough? Is it way too much? Need real NP04 data rates and sizes for second beam run.
- Conservatively assuming 25MB/s per 4GB file across Atlantic, need 50 simultaneous transfers going continuously to use 10Gbit/s (1.25GB/s)
- Reliability goal:
 - Generate enough test data to send 100TB
 - Run for 24 hrs/day or until we send 100TB whichever comes first
 - Monitor systems during Europe and US business hours (0800-2200 UTC)

DAQ Machines

- NP02 (vertical drift)
- np02eos1, np02eos2
- Need to shift from pushing file to EOS, to having ingest daemon do 3rd party transfer between np02eosx and eospublic
- vd-coldbox-top (top electronics) data set available for test, 50 TB of root files
- Vd-coldbox-bottom (bottom electronics) data set available, 15 TB of HDF5 files (so far)
- NP04(horizontal drift)
- Np04-srv-00[1-4]
- Need to add authentication to xrootd servers
- What data to use for horizontal drift test?
 - No MC available yet
 - HD Coldbox stuff not analyzable

Data Generation for challenge

- For Phase 1, data pipeline, we could use anything as long as it's the right file size.
- But it would be ideal to use the data pipeline to get the files for Phase 2 (processing) in place, otherwise we will have to do that too.
- Can use a small collection of either Monte Carlo or Data files but ideally whatever we use should be reconstructable
- Write shell script to copy these files to the target directories on the DAQ machines but change the file names and the metadata in the following ways
 - DC4 included in file name and DUNE.Campaign
 - A timestamp in every single file to make the name unique
 - A DC4 special scope and file family for all the data
 - Emulate a series of increasing run numbers preferably in a nonused run number range.. This is needed both for storage and for rucio data sets.

Ingest Daemon (~~FTS-Light~~)

- Developer Responsible — Igor Mandrichenko — FNAL
- Status — Beta testing ready to go.
- Differences from before: Now use FTS-3 to do the file transfer from EHN1 to CERN Public EOS, instead of the daemon doing it directly

Declaration Daemon (Temp. F-FTS Repl).

- Responsible Developer: Igor Mandrichenko (FNAL)
- Status: Coding in progress
- Differences from before: Trust Rucio / FTS3 to do the cross—Atlantic file transfers rather than doing them itself
- This is *temp* solution for the data challenge and will be re-evaluated later.
- This is critical path but we expect it can be ready on schedule

Rucio mods for R/W RSE's

- Responsible developer: James Perry, Edinburgh
- Status: Ready for test
- Testing responsibility: B. White / FNAL, S. Timm / FNAL
- Differences from before:
 - Forcing everything new declared in Rucio to have also been declared in MetaCat already
 - Supplying a new LFN-to-PFN path
- Critical path.. Can't use Rucio to move data until FNAL_DCACHE and CERN_PDUNE_CASTOR (CTA) are read/write
- Critical Path: Need all clients packaged and in CVMFS.

MetaCat

- Developer responsible: Igor Mandrichenko (FNAL)
- Status: Stable but need to test at scale.
- New features: now datasets can have metadata as well as files
- Critical Path:
 - Need to give DAQ instructions on how to make metadata JSON files that can be used with either MetaCat or SAM
 - Need to give offline instructions on how to make metadata within a job

Benchmark testing on file transfers

- Responsible: TBD
- How to optimize 3rd party transfers for xrootd and https
- How to make sure we can get the rate of 100TB/day (10Gbit/s)
- Are there any roadblocks in Rucio itself or in FTS3
- Point to point iperf from inside EOS to inside FNAL to check network bandwidth and routing of new transfers
- Information needed: Need help from CERN for right access point for benchmarking and how to access the network. (We have names of whom to contact but not the info yet).

Monitoring:

- Responsible: TBD
- Status: OMG
- We have names of people to contact but no answers yet.
- In Phase 2, data dispatcher and workflow allocator need to be hooked up to Elasticsearch (to give access to similar monitoring as we've done for SAM)
- In Phase 1, have to make sure existing Rucio monitoring keeps working stably and find the existing FTS3 monitoring.