Grid and Data Access: Status and Future

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File Compactor and Data Mover

"File Compactor" automated within Run Control
RAW data runs identified for permanent storage by the act of running the File Compactor on them (auto or manually).

Autonomous process - "Data Mover" - then made copy at RAL Tier 1 for tape archival

- Proxy renewal automated from hardware token

Separate agents (GDA) then made copies at Imperial, Brunel and RAL PPD.

Gathered 4532 GB in the final User Cycle, at up to 11 GB/hr stored and replicated.

Several times we'd see a series of failures writing into CASTOR.

Still getting occasional drop-outs of the hardware token, possibly caused by EMI.

Compactor and Data Mover turned off since January

RAW Data

The RAW Data has a citable DOI:

doi:10.17633/rd.brunel.3179644

DOIs have also been requested for RECO and Simulation

This will lead the readers of your paper directly to downloadable tarballs from which they can replicate your results.

- all runs to 10699 have the RAW data on two tapes within Castor
- all runs to 10699 have the RAW and Offline RECO at Imperial and RAL PPD
- all runs to 10699 have the RAW data at Brunel
- All RAW data tarballs have overall checksums which matched between Castor and original MLCR copy
- 1.9 TB of RAW data in Step I,
  15 TB of RAW in Step IV (to run 10699).

I will shortly change permissions to make this even more read-only than it is already...

CVMFS

CVMFS is

- a read-only filesystem based on HTTP; uses caching to give (usable) global coverage
- the master copy, Stratum-0, is at the RAL Tier1
- installed on Grid clusters worldwide; also interactive machines at Brunel, Imperial and RAL PPD
  - `/cvmfs/mice.egi.eu/`
- Presently build MAUS in MLCR, then the binaries moved to the Stratum-0 and replicated across the Grid.
- Official versions of MAUS available, up to MAUS-v3.1.2

(The readers of your paper can then use this to replicate the results you got from that data...)

Offline Reco

The Offline Reco – live during data-taking – was running on a dedicated machine (`offrec01`) in the MLCR to allow faster MAUS updates than previous Grid version.

Inclusion of globals slowed the reconstruction down again – last User Cycle ran a fast, cut-down version "live" and the slow version asynchronously.

Autonomous process - "RECO Mover" – then made copy at RAL Tier 1 for tape archival

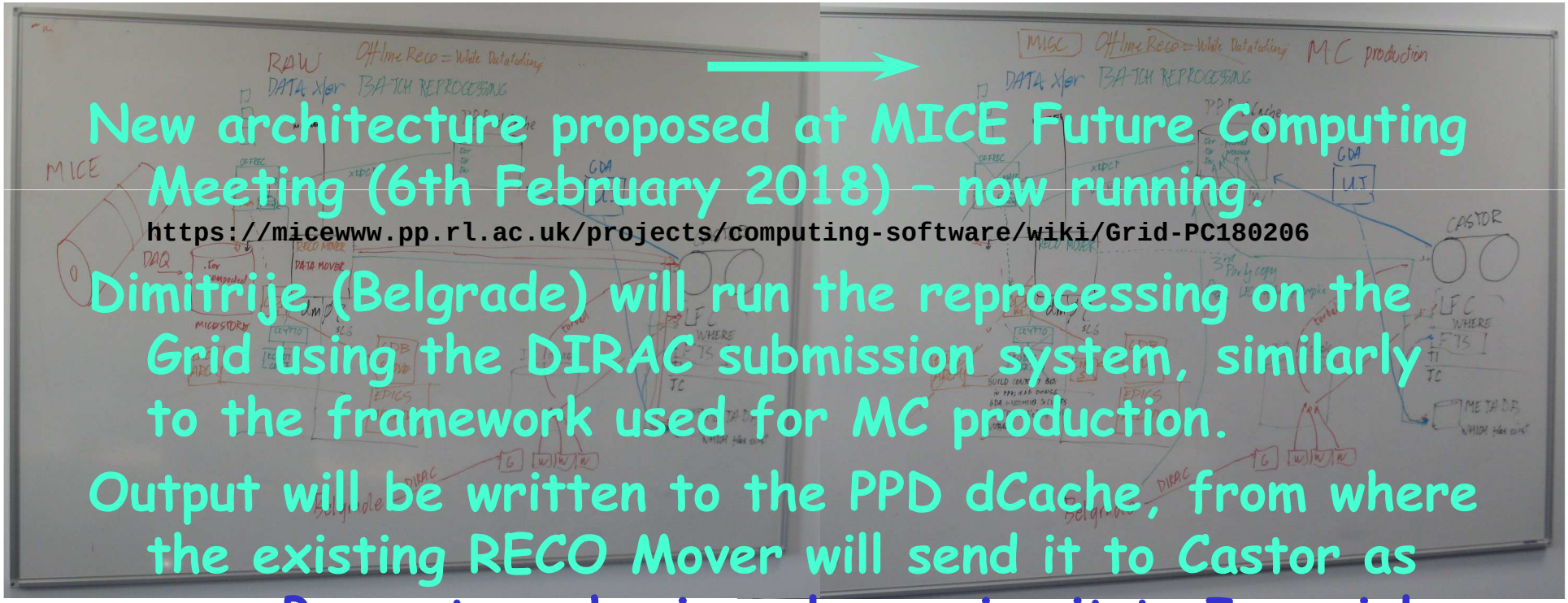
- RECO Mover developed from the Data Mover
- Proxy renewal automated from hardware token

The same GDA instances as for RAW then made copies at Imperial and RAL PPD.

This mechanism since used for Batch Reprocessing – but far too slow.

Batch Reprocessing

Batch Reprocessing – bulk reconstruction of old data with a new version of MAUS or geometry – is now far too slow to do in the MLCR.



New architecture proposed at MICE Future Computing Meeting (6th February 2018) – now running.

https://micewww.pp.rl.ac.uk/projects/computing-software/wiki/Grid-PC180206

Dimitrije (Belgrade) will run the reprocessing on the Grid using the DIRAC submission system, similarly to the framework used for MC production.

Output will be written to the PPD dCache, from where the existing RECO Mover will send it to Castor as now. Present mechanism also copies it to Imperial.

MC Production

For MICE simulation is a two-step process:

- g4beamline is used to model scattering from the Target and transport of particles into the DSA.
- MAUS is then used to propagate through the downstream quads and through the Cooling Channel, and generate the detector responses.

The codes are run separately on the Grid, by Dimitrije from Belgrade. Output written to Imperial's Grid storage.

Collating an entire simulation run and archiving to tape is still in progress...

Miscellaneous Data

Longstanding drive to archive a variety of data from other activities in MICE, e.g.:

- Detector Tests (testbeam and cosmic data)
- Field Maps (measured and simulated)
- Geometry and surveys
- Technical drawings
- Tracker calibrations
- Muon Beams library
- EPICS Archiver archive
- MICE Target performance data

These are examples of alternative data within the MICE project, to give YOU an idea of the sort of thing to consider. Also see thread from eLog entry 942. They're here because I've already thought of them: that's why some have already made progress. Stuff I **haven't** thought of, isn't going anywhere until YOU tell me about it!

(Note that data curation and open access is a hot topic with the funding agencies)

Miscellaneous Data (geometry surveys, field maps, etc.) has a citable DOI:

doi:10.17633/rd.brunel.5024885

Miscellaneous Data

The Grid storage is my responsibility (wearing my Archivist hat) but preparation, indexing and making incoming data available rests with its creator!

`https://micewww.pp.rl.ac.uk/projects/computing-software/wiki/GridDataStorage`

By definition, I can't know about your data unless you tell me – it has to be a "push" model!

As asked repeatedly over the years, e.g. CM48 Collaboration Board, this January VC; the only official route for permanent storage of MICE data is for the MICE Archivist (presently, me) to write it to the Grid.

This means the information I need – e.g. how to get the data and what it is – must be sent to me by **3rd April 2018**.

Data Curation

RAL Tier 1 are committed long-term as the custodial repository of MICE data (on tape). This is NOT the same as fairy magic:

Over Christmas, Imperial lost an entire disk server containing MICE data. They lodged a GGUS ticket against MICE and three of us had to identify, retrieve or re-generate, and re-upload the missing data to make it available for download again. ← active intervention

MICE has a "Data Management Plan" (MICE Note 396) which seems to commit the collaboration to making the data freely and publicly available, but no obvious (to me) strategy for ensuring this continue. Ongoing tasks – simulation and reprocessing – are compute-heavy and we are losing local-to-RAL personnel; hence push to do *more* on the Grid, but no sign of people to take this over.

Data Curation and Future Needs

In January VC I wrote:

The experimental phase of MICE at RAL looks to be coming to an end. Aim of this talk is to summarise what needs doing for ongoing data access – people may want to carry on doing analysis for a couple of years...

I have made a first pass at identifying some of the responsibilities in MICEmine ticket #1947.

On a personal note, my contract will also end which implies a lot of things to finish off and clear away, and not only on the MICE Grid & Muon Beamline. This means that any handover of expertise arising will need to be focussed on the next couple of months.

↖ already two months later, nothing.

Various Continuing Roles

There is a long list of other tasks that will need to continue, see #1947:

- VOMS Administrator
- Tier1/Castor liaison
- Data Manager (contact point for data loss)
- Robot certificate owner and token maintenance
- RECO data movement operator
- Simulation production
- etc...

These roles are all small fractions of an FTE – but they all require regular, active interventions. And the skills.

Suitable people will need to volunteer, get themselves sorted out with Grid access, *and get the handover training* before I leave the project.

https://micewww.pp.rl.ac.uk/issues/1947