Status of MICE on the GRID

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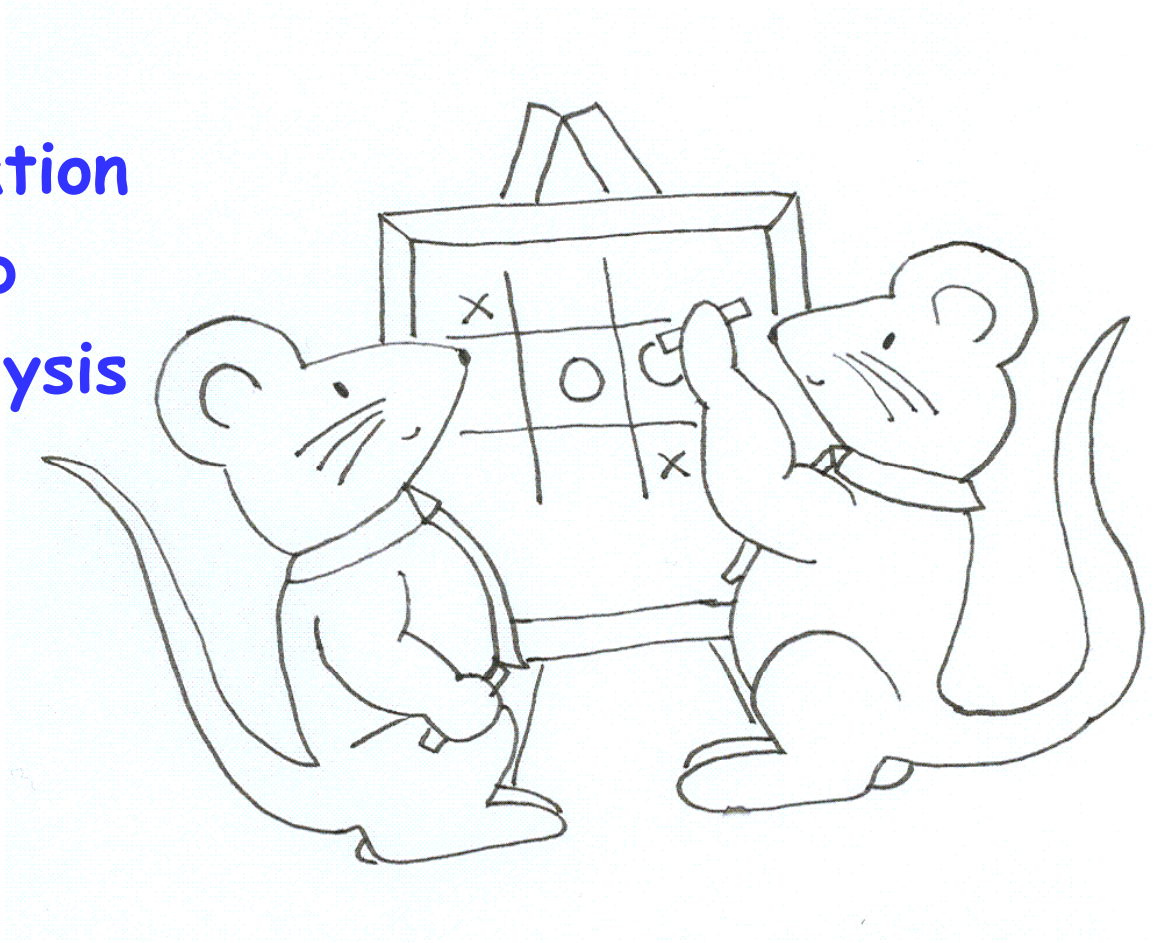

MICE VO

- VO = Virtual Organisation.
- MICE VO has been setup for a while.
- Now has a reasonable amount of computing resources (next slide).
- To join the MICE VO you need to:
  - Obtain a GRID certificate
  - Request membership of the MICE VO using that certificate.
- You can then submit jobs to the GRID.

CEs

- CE = Computing Element.
- We currently have computing resources provided for MICE by:
  - Brunel
  - Imperial
  - QMUL
  - RHUL
  - Sheffield
  - Liverpool
  - ScotGRID
  - Glasgow
  - Sofia
- A little UK-heavy...

G4MICE Installation

- I have spent the past two weeks learning how to install software on the GRID and have now installed the most recent release of G4MICE (1-9-5) at:
  - Brunel
  - QMUL
  - RHUL
  - Sheffield
- I hope to complete the rest in the next few weeks.

Example Test Job

- Part of the installation process includes running a cycle of Simulation, Digitisation, Reconstruction and Analysis in ROOT to check that the software has installed correctly and is running.
- This test has also been run by David Forrest and will be on the web as an example for new users (after a "Hello World" type of job).

Test Job – testmice.jdl

```
[
    VirtualOrganisation = "mice";
    Executable = "g4mice_test.csh";
    Arguments = "1-9-5";
    StdOutput = "out.g4mice.test.txt";
    StdError = "err.g4mice.test.txt";
    InputSandbox = {
        "g4mice_test.csh",
        "cards.match",
        "cards.stage6"
    };
    OutputSandbox = {
        "out.g4mice.test.txt",
        "err.g4mice.test.txt",
        "sample.root"
    };
    RetryCount = 0;
    requirements = Member( "VO-mice-1-9-5", other.GlueHostApplicationSoftwareRunTimeEnvironment ) &&
     other.GlueCEPolicyMaxWallClockTime>121 ;
    JobType = "normal";
    Type = "Job"
]
```

Test Job – g4mice_test.csh

```
#!/bin/csh
#usage: g4mice_test.csh <version>
# Setup:
set micever=${1}
echo "Using G4MICE release ${micever}"
source ${VO_MICE_SW_DIR}/mice-${micever}/setupmicegrid.csh
echo "Generating a matched beam"
${MICESRC}/Applications/Matcher/Matcher cards.match
echo "Simulating the beam"
${MICESRC}/Applications/Simulation/Simulation cards.stage6
echo "Digitising the simulated data"
${MICESRC}/Applications/Digitization/Digitization cards.stage6
echo "Reconstructing the simulated data"
${MICESRC}/Applications/Reconstruction/Reconstruction cards.stage6
echo "Generating a ROOT file"
${MICESRC}/Applications/RootHistograms/RootHistograms
ls -ltrh
echo "Test job is done"
```

Test Job – cards.match

```
! Cards to make a matched 2.5 pi beam in the upstream tracker in step 6
!
MiceModel                        MICEStage6/Stage6.dat
numEvts                          1000
ZOffsetStart                     -5893.  mm          !the point at which the beam is
    generated
InputBeamFileName                  for0028.matched.dat !the name of the file that is
    generated
!
NormalisedCanonicalAngularMomentum  0.
LatticeStart                    -2750. mm  !the start of the cooling channel lattice
LatticeEnd                       2750. mm  !the end of the cooling channel lattice
EnergyAtLatticeStart               226.  MeV !energy of the reference particle at the
    lattice start
TransverseEmittance                2.5   mm  !transverse emittance of the beam at the
    start of the lattice
LongitudinalEmittance             0.13 ns !longitudinal emittance of the beam at the start
    of the lattice
!
```

Test Job – cards.stage6

```
!****General
MiceModel MICEStage6/Stage6.dat
!
numEvts 1000
!
ZOffsetStart -5893 mm
InputBeamFileName
   for0028.matched.dat !the name of the file that is
   generated
BeamType ICOOL
!
```

Test Job - Operation

```
young: /data/eestmme/grid/examples/test> edg-job-list-match testmice.jdl

Selected Virtual Organisation name (from JDL): mice
Connecting to host lcgrb02.gridpp.rl.ac.uk, port 7772

**********************************************************************************
                        COMPUTING ELEMENT IDs LIST
 The following CE(s) matching your job requirements have been found:

                        *CEId*
 ce02.esc.qmul.
 ce02.esc.qmul.
 ce1.pp.rhul.ac
 dgc-grid-44.br
 lcgce0.shef.ac
**********
```

```
young: /data/eestmme/grid/examples/test> edg-job-get-output -i job.test

Retrieving files from host: lcgrb02.gridpp.rl.ac.uk ( for https://lcgrb02.gridpp.rl.ac.uk:9000/0UuVTCnWKh2hjukn_oNQ6w )

**********************************************************************************
                        JOB GET OUTPUT OUTCOME

 Output sandbox files for the job:
 - https://lcgrb02.gridpp.rl.ac.uk:9000/0UuVTCnWKh2hjukn_oNQ6w
 have been successfully retrieved and stored in the directory:
 /tmp/jobOutput/eestmme_0UuVTCnWKh2hjukn_oNQ6w

**********************************************************************************

young: /data/eestmme/grid/examples/test> ls -ltrh /tmp/jobOutput/eestmme_0UuVTCnWKh2hjukn_oNQ6w
total 488K
-rw-r--r--  1 eestmme eesf 8.5K Feb 10 11:51 sample.root
-rw-r--r--  1 eestmme eesf 146K Feb 10 11:51 out.g4mice.test.txt
-rw-r--r--  1 eestmme eesf 306K Feb 10 11:51 err.g4mice.test.txt
young: /data/eestmme/grid/examples/test>
```

```
young: /da
**********
BOOKKEEPING INFORMATION:

Status info for the Job : https://lcgrb02.gridpp.rl.ac.uk:9000/0UuVTCnWKh2hjukn_oNQ6w
Current Status:     Done (Success)
Exit code:          0
Status Reason:      Job terminated successfully
reached on:         Sun Feb 10 11:47:08 2008
**********
```

StationQA Analysis

- To launch the "Data Challenge" I have re-run the analysis of all of the StationQA data from the tracker entirely on the GRID.
- The data was transferred to a storage element at Brunel (setup by Henry) and the GRID jobs retrieved the files for each Station and ran the analysis application on them.

StationQA on the GRID

- Data from 12 Stations (6-17) analysed.
- Total of 12,389,135 events processed.
- 167 of 173 files transferred (6 failures are being investigated).
- Total of 233.8 GB data was transferred, unzipped and reconstructed.
- Total time from starting first job to end of last job: 4 hours and 6 minutes!

Analysis Jobs

- David Forrest is starting up a major production of 96 different geometrical configurations that will be simulated with high statistics to assess the impact of various misalignments and rotations on emittance measurement.

File Storage

- Apart from the special storage that Henry set up for the station QA, we do not have the full infrastructure required for storing large amounts of data.
- This requires an LFC to be setup.
- Need to work out who will set this up, where it will be hosted...

Documentation

- Now that there are usable resources, I will start to write up some documentation on the web to help people get started with getting a certificate, joining the VO and running jobs.

Next Steps

- Complete installation of mice-1-9-5 on remaining CEs.
- Work with Henry and others to setup an LFC.
- Post documentation on the MICE website.
- Launch David's large simulation and analysis production.