LHC experiments use of EDG Testbed

F Harris (Oxford/CERN)

Outline of presentation

- Experiment plans and relation to data challenges and use of Grid facilities/services

  - ATLAS(currently Task Force activity) **O Smirnova,L Perini**
  - ALICE **P Cerello**
  - CMS **P Capiluppi**
  - LHCb **E van Herwijnen**

- Comments on services required by all experiments **Experiments and 'loose cannons'**

- Summary

ATLAS

- Currently in middle of Phase1 of DC1 (Geant3,Athena reconstruction,analysis). Many sites in Europe+US+Australia,Canada,Japan,Taiwan are involved
- Phase2 of DC1 will begin Oct-Nov 2002 using new event model
- DC2 start end Oct 2003, and will operate in framework of LCG with inter-operability between EU, US and other sites.
    - For DC2 will interface to Grid from architecture as well as from scripts
    - 1.2 and 2 Testbeds will be used to prepare this work(scale and performance tests)

- Plans for use of Grid tools in DCs
  - Atlas-EDG Task Force to repeat with EDG 1.2. ~1% of Geant3 simulations already done. Using CERN,CNAF,Nikhef,RAL,Lyon
    - (see O Smirnova talk in WP8 meeting Sep 3 at Budapest)
  - Phase2 will make larger use of Grid tools. Maybe different sites will use different tools. There will be more sites. This to be defined Sep 16-20.

    - **~10**6 CPU hrs** **20 TB input** to reconstruction **5TB** ouput(? How much on testbed?)

Current Atlas Task description

- Input:
  set of generated events as ROOT files (each *input partition* ca 1.8 GB, 100.000 events); master copies are stored in CERN CASTOR

- Processing:
  ATLAS detector simulation using a pre-installed software release 3.2.1

  - Each input partition is processed by 20 jobs (5000 events each)
  - Full simulation is applied only to filtered events, ca 450 per job
  - A full event simulation takes ca 150 seconds per event on a 1GHz processor)

- Output:
  simulated events are stored in ZEBRA files (ca 1 GB each *output partition*); an HBOOK histogram file and a log-file (stdout+stderr) are also produced

- Total: 9 GB of input, 2000 CPU-hours of processing, 100 GB of output.

ALICE

- Alice assume that as soon as a stable version of 1.2.n is tested and validated it will be progressively installed on ‘all’ EDG testbed sites

- As new sites come will use an automatic tool for submission of test jobs of increasing output size and duration

- They believe Alien has more functionality than EDG in data management e.g.
  - Hierachy of Data/Metadata Catalogue
  - C++ API which allows data access via ‘open’ calls from Aliroot

- They are implementing interface between Alien and EDG.
  - Job Submission will work in pull mode according to availability of WNs on Ces. Job moved to EDG UI and submitted to RB.
  - EDG nodes will have access to Alien Catalogue to register/query
  - Alien nodes will be configured as EDG SEs, so EDG nodes can red/write/retrieve data on Alice controlled farms

ALICE planning for tests

- at the moment do not plan a "data challenge" with EDG.
- Will concentrate the AliEn/EDG interface and on the AliRoot/EDG interface in particular for items concerning the Data Management.
- However plan a data transfer test, as close as possible to the expected data transfer rate for a real production and analysis.
- concerning AliEn/EDG interface have configured the Torino farm both as AliEn Client and as EDG UI, CE, SE.
- plan to try there the first jobs sent to "AliEn" and automatically moved to EDG. We also plan to test there the access to data registered in the AliEn Catalogue from an EDG job.

- In addition to Torino will use CERN, CNAF,Nikhef,Catania and Lyon for first tests
- CPU and store requirements can be tailored to availability of facilities in testbed – but will need some scheduling and priorities

CMS

- CMS currently running production for DAQ Technical Design Report(TDR)

  Requires full chain of CMS software and production tools. This includes use of Objectivity.
- 5% Data Challenge(DC04) will start Summer 2003 and will last ~ 7 months. This will produce 5*10**7 events. In last month all data will be reconstructed and distributed to Tier1/2 centres for analysis.
  - 1000 CPUs for 5 months 100 TB output

- Use of GRID tools
  - Will not be used for current production
  - Plan to use in DC04
  - Currently testing integration of CMS environment in EDG+EDT testbeds. Will test integration in EDT+iVDGL test layout
  - EDG 1.2 will be used to make scale and performance tests (proof of concept). Tests on RB, RC and GDMP. Will need Objectivity for tests.
  - V2 seems best candidate for DC04 starting summer 2003(has functionality required by CMS)

Facilities for CMS use of testbed to Christmas

- Sites
  - Current (will be expanded for DC04)
    - EDG 1.2 : IC,RAL,CNAF/BO,Padova,CERN,Nikhef,IN2P3,Ecol-Poly,ITEP
    - EDT : IC,CNAF/BO,Padova,Ecole Poly
- CPU/STORE(modest requirements)
  - ?~ 50 CPUs distributed over sites (quasi-dedicated for priority running in 'agreed' periods)
  - ~200 Gbyte disk store at a few SEs

LHCB

- First intensive Data Challenge starts Oct 2002 – currently doing intensive pre-tests at all sites.
- Participating sites for 2002
  - CERN,Lyon,Bologna,Nikhef,RAL
  - Bristol,Cambridge,Edinburgh,Imperial,Oxford,ITEP Moscow,Rio de Janeiro
- Use of EDG Testbed

  - Install latest OO environment on testbed sites. Flexible job submission Grid/non-Grid
  - First tests(now)
    - **Run 500 event MC generation**
    - **Store on SE**
    - **Recover data and histograms to CERN**
    - **Run reconstruction. Output to SE. Recover log files and histos.**
    - **Write recon output to Castor.**
    - **Read Castor data with an analysis job.**
  - Large scale production tests(by October)
  - Production (if tests OK)
    - **Aim to do percentage of production on Testbed**

Facility requirements for LHCb DC1

- Total of ~3*10**7 events (signal + background)-detector studies
- Total CPU ~30K Ghz days. I.e. 50 days of 600 1GHz CPUs
  - A very rough scenario- not contractual! (300 CERN,100 Bologna,100 RAL, 50 Lyon, 50 Nikhef + others)
  - ?? How much of this could be in Testbed
- Storage for 3*10**7 events
  - Brute force (2 Mbyte/ev) 60TB!
  - Compressed to 200 kbyte/ev 6 TB (demand on Castor at CERN)
  - And more compressed for analysis (20 kbyte) .6 TB

- General comments from experiments and ‘loose cannons’ on expectations for Testbed

Operation of Sites

- Stability more important than size
  - Application testbed sites have to be available most of the times
  - Smaller testbed sites might introduce instability to the whole Grid
  - Jobs typically run for 24 hours. This sets the scale of the needed stability (~weeks)
- Configuration of sites
  - Must be tested and documented (flag in the Information Index?)
  - Probably not all sites will be set up properly. EDG must cope with this situation.
- Various Testbeds
  - Need for Development, Validation and Application testbeds clearly demonstrated.

Monitoring and Documentation

- Status of the Grid
  - Up to now no real overview of the status of the Grid is available
  - Users can only guess about the resources available
  - A central status web-page would be useful (a la CERN IT status pages)
- Documentation
  - It is all there, but very scattered.
  - "Unified" modular documentation needed(and thanks for big current efforts)
    - User Guide
    - Release notes
    - Installation Guide
    - ….
  - Please dont mix these. 150 page manuals that cover EVERYTHING will not be read. The user will not find the relevant info.

Support

- Middleware WP contact persons needed
  - Sometimes difficult for applications to identify the proper person in a MW-WP. Dedicated contacts could help. The turn-around time in Bugzilla is sometimes too long. These contacts could speed up things.
- Debugging
  - It takes a long time in certain cases until the proper person is assigned to a given bug using Bugzilla.(see above)
  - More intensive testing is required during integration.
    - Should be covered by EDG test group(as agreed at Chavannes)

Summary

- Current WP8 top priority activity is Atlas/EDG Task Force work
  - **Please come to O Smirnova talk tomorrow afternoon in WP8 session**
- Will continue Task Force flavoured activities with other experiments
- Current use of Testbed is focused on main sites (CERN,Lyon,Nikhef,CNAF,RAL) – this is mainly for reason of support
- Once stability is achieved (see Atlas/EDG work) will expand to other sites. But we should be careful in selection of these sites. Local support is essential.

- MAIN ISSUES(process, management, and people)
  - When will we be ready to have broader distribution of EDG 1.2.n with good documentation?
  - Installation, validation and support of software at 'non-major' sites
  - Relationship between support for 'gridified' applications and middleware support at sites (user support)
  - Organisation of VOs in EDG testbed
    - Will need to define quotas and priorities within a VO
    - Will need to organise priority periods for particular Vos
    - Scheduling use - ? Atlas may have big demand
- THANKS
  - To members of IT for heroic efforts in past months