**gLite system**

What we have now

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**NA62 gLite-based Grid Production System**

Up and running since mid-2012, encompassing 5 UK sites and one Belgian. Used for the first production/simulations round (Sep 2012 - May 2013): 28 decay channels, 22,675 runs, 19,469 files produced, 200,000 cumulated CPU hours, 29 TB of data on CASTOR.

**Data produced was used for**

Improving the detector geometry/acceptance, the digitisation and reconstruction software, refining the background studies and the trigger; fixing problems in our MC software.

**Long term prospects**

Some components will be outdated in the not so far future: support for WMS is shrinking within the Grid community, LFC is being phased out; new and more capable frameworks are available.

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**Table: NA62 MC Production Rounds**

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
<th>Runs</th>
<th>Files</th>
<th>Total size</th>
</tr>
</thead>
<tbody>
<tr>
<td>K02nunu</td>
<td>Production round, 500k events decay type 104, $K^0 \rightarrow e^+ e^-$ (K02nunu)</td>
<td>145</td>
<td>93</td>
<td>0.08 TB</td>
</tr>
<tr>
<td>K02nunu</td>
<td>Production round, 500k events decay type 103, $K^0 \rightarrow \mu^+ \mu^-$ (K02nunu)</td>
<td>119</td>
<td>93</td>
<td>0.03 TB</td>
</tr>
<tr>
<td>K02nunu</td>
<td>Production round, 500k events decay type 102, $K^0 \rightarrow e^+ \mu^-$ (K02nunu)</td>
<td>119</td>
<td>83</td>
<td>0.06 TB</td>
</tr>
<tr>
<td>K02nunu</td>
<td>Production round, 500k events decay type 101, $K^0 \rightarrow \mu^+ \nu^- (K02nunu)$</td>
<td>167</td>
<td>89</td>
<td>0.06 TB</td>
</tr>
<tr>
<td>K02nunu</td>
<td>Production round, 500k events decay type 100, $K^0 \rightarrow e^- \mu^+ (K02nunu)$</td>
<td>220</td>
<td>152</td>
<td>0.12 TB</td>
</tr>
<tr>
<td>K02mup, mum, map-1</td>
<td>Production round, 500k events decay type 124, $K^0 \rightarrow 2\mu^+ \mu^- (K02mup, mum, map)$</td>
<td>127</td>
<td>105</td>
<td>0.07 TB</td>
</tr>
<tr>
<td>K02mup, mum, map-2</td>
<td>Production round, 500k events decay type 123, $K^0 \rightarrow 2e^- \mu^+ (K02mup, mum, map)$</td>
<td>391</td>
<td>287</td>
<td>0.36 TB</td>
</tr>
<tr>
<td>K02mup, mum, em-1</td>
<td>Production round, 500k events decay type 122, $K^0 \rightarrow 2e^- \mu^- (K02mup, mum, em)$</td>
<td>405</td>
<td>404</td>
<td>0.46 TB</td>
</tr>
<tr>
<td>K02mup, mum, em-2</td>
<td>Production round, 500k events decay type 121, $K^0 \rightarrow 2e^- \nu^- (K02mup, mum, em)$</td>
<td>308</td>
<td>158</td>
<td>0.16 TB</td>
</tr>
<tr>
<td>K02mup, mum, em-3</td>
<td>Production round, 500k events decay type 120, $K^0 \rightarrow 2e^- \mu^+ (K02mup, mum, em)$</td>
<td>162</td>
<td>78</td>
<td>0.31 TB</td>
</tr>
</tbody>
</table>

Total**: 2041 runs, 1254 hours of cumulated runtime, 1033.5 GB files, 3.7 TB of output data

* The success rate is defined as jobs done successfully and counts killed jobs. Failures due to configuration errors etc.
** excluding sink runs.
*** this is a rough estimate based on average CPU has HEPSPEC06
Components examined

**Rucio**
Is an ATLAS Distributed Data Management (DDM) system capable of managing large volumes of experiment, generated and derived data, and used to manage accounts, files, datasets and distributed storage systems.

**PanDA**
PanDA provides an integrated service architecture with late binding of jobs, maximal automation through layered services, tight binding with ATLAS DDM system, advanced error discovery and recovery procedures, etc.

**CVMFS**
A caching, http-based read-only filesystem optimised for delivering experiment software to (virtual) machines. Originally developed as part of the CernVM project, is potentially even more promising for physical worker nodes.

**Ganga**
Ganga is an easy-to-use frontend for job definition and management, implemented in Python. It has been developed for ATLAS and LHCb, and includes built-in support for configuring and running applications based on the experiments' frameworks.
The DIRAC (Distributed Infrastructure with Remote Agent Control) is a software framework for distributed computing providing a complete solution to a user community requiring access to distributed resources.

DIRAC builds a layer between the users and resources offering a common interface to a number of heterogeneous providers, integrating them in a seamless manner, while providing interoperability and an optimised, transparent and reliable access to computing resources.
And the winner is …

**DIRAC** is a complete workload and data management system, which is in production use by LHCb and ILC. Furthermore, it is nowadays an independent project and features and long-term support outside of the LHCb community. There is already a NA62 VO enabled DIRAC installation at Imperial College in London, which was used for testing over the summer of 2014.

**Rucio** offers services that allow the ATLAS collaboration to manage large volumes of experimental, generated and derived data, within the ATLAS distributed computing system. However, it is relatively immature and designed for a much bigger data management problem than NA62’s.

**PanDA** architecture is well suited for the computing needs of the ATLAS experiment who requires petabyte scale production and distributed analysis processing. Although PanDA has some users outside ATLAS, this usage is less mature than that of DIRAC.

**Ganga** is implemented as a plugin in the current gLite-based NA62 system, however, by itself Ganga cannot completely replace the existing functionality.

**CVMFS** is already in use by the UK grid sites participating in NA62. We highly recommend CVMFS for software distribution.

Regardless of the components used, NA62 will employ a custom-built layer providing collaboration-specific functionality that depends on the structure and usage of the data, desired features etc. This is a very lightweight layer, that can be designed to be robust and easily reconfigurable, and will be well documented.
We’ve cloned the existing gLite-based system, and changed all the bindings to use DIRAC for job submissions and management, file transfers, etc.

The new web interface is located at [http://dna62.gla.ac.uk](http://dna62.gla.ac.uk) and is identical in functionality with the old NA62 grid production interface.

We’ve kept the gLite based interface fully functional, and the two share the same (custom) MySQL database.

The plan is to employ this system during the next production season.
Current status

Full functionality:
- jobs table
- files table
- production table
- search form
- test submission form
- production submission form
- automation scripts

To do:
- streamline file registrations and transfers
- full benchmarking
- evaluate DIRAC’s builtin DM
- iPhone webapp

Close contact is maintained with DIRAC developers in case we encounter problems or we desire new features.
A fully-featured and robust electronic logbook was implemented for use during NA62 Grid production shifts.

Explore it and register to use it at

na62.gla.ac.uk/elogs

This MySQL-backended electronic logbook is available as an easily customisable toolkit and could be used as a runlog as well.
THE END

QUESTIONS ? IDEAS ?

Check out http://dna62.gla.ac.uk

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