DataGrid and NorduGrid projects

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Outline

- Grids: meta-computing revisited
- DataGrid project at CERN
- NorduGrid
  - Purposes
  - Participants
  - Status
Grids are networks of geographically distributed high performance computers, large databases, and high end instruments.
LHC Computing

- Grid technologies seem to be a convenient solution

Slide re-used from www.globus.org
The DataGrid: an EU project initiated at CERN

- Objective: to enable next generation scientific exploration which requires intensive computation and analysis of shared large-scale databases, from hundreds of TeraBytes to PetaBytes, across widely distributed scientific communities.

- Partners: CERN, CNRS, ESA/ESRIN, INFN, NIKHEF, PPARC and 15 associated partners (including NFR/Sweden).

- Now at http://www.eu-datagrid.org
NorduGrid

- Project launched in frameworks of both Nordunet2 and DataGrid

http://www.quark.lu.se/grid

- Nordunet2 (http://www.nordunet2.org) aims at developing networks for education, medicine, libraries, etc
- In Nordic countries, DataGrid activity is mostly concentrated on application development
- DataGrid applications are perfect benchmarks for Nordunet2
## Participants

<table>
<thead>
<tr>
<th>Country</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Denmark</td>
<td>Copenhagen University: Niels Bohr Institute, Research Center COM, DIKU</td>
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<td>Norway</td>
<td>Oslo University, Bergen University</td>
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<tr>
<td>Sweden</td>
<td>Lund University, Uppsala University, Stockholm University, KTH</td>
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<td>Finland</td>
<td>Helsinki Institute of Physics</td>
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## Work Packages

<table>
<thead>
<tr>
<th>Work Package</th>
<th>Responsible Parties</th>
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<tbody>
<tr>
<td>1. Test bed hardware</td>
<td>NBI, Lund, Stockholm</td>
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<tr>
<td>2. Farm software</td>
<td>NBI, Lund, KTH, Stockholm, HIP, COM, DIKU</td>
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<td>3. Grid monitoring services</td>
<td>Lund, KTH</td>
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<td>4. Grid data management</td>
<td>COM, DIKU</td>
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<td>5. User applications and benchmarks</td>
<td>NBI, Lund, KTH, Stockholm, HIP</td>
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<td>6. Dissemination</td>
<td>all</td>
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Plan and deliverables

- V-01: Copenhagen-Lund test bench - HEP simulation
- IX-01: tests involve all participants
- X-01: job submission and monitoring via WWW
- I-02: access control, full security
- III-02: global accounting system
- VI-02: full functionality, multidisciplinary access

A generic use-case:
- User "U" executes task "T" at a computer farm "C", possibly referring to data at "D"
  - "C" and "D" are likely to be combined
  - performance in different configurations (C1 vs. C2, T1 vs. T2) to be compared
Current status

- 5-6 February, 2001: first NorduGrid meeting in Lund (concentrated mostly at WP2 and WP5)
  - Globus toolkit installed at most places
  - 3 test benches (2 in Lund, 1 at NBI) to be enabled
  - Benchmark test and other physics applications are being defined
**Use-case: B-physics study**

- **Team:** Lund University ATLAS group
- **Task:** $B_s \rightarrow J/\psi \eta$ analysis - estimate efficiencies of $J/\psi$, $\eta$ and $B_s$ reconstruction; acceptance, resolution, tagging etc.
  - MC generation
  - Detector simulation
  - Reconstruction
  - Analysis
- **Sample:** 1 hour of LHC running - 1000 events
- **Requires:** $\approx 10^7$ SI95 s (full simulation), $\geq 1$ MB ZEBRA output
- **Performance can be compared to MONARC simulation**
Summary

- NorduGrid is launched to test the applicability of Grid technologies; will last until July 2003
  - Two dedicated post-doc positions (in Lund and Uppsala/Stockholm) to be filled in soon
- B-physics study proposed as a benchmark, other applications to follow
  - Uppsala: charged Higgs study, multidisciplinary project; Stockholm: t.b.d.; other countries: Higgs, Hera-B, supersymmetry, industry applications etc