Web-based interface to desktop grid computing resources

Natalia Nikitina, Evgeny Ivashko
Institute of Applied Mathematical Research, KRC RAS, Russia

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Established in 1975

Major research trends:

- mathematical and informational modelling for ecological, energy and other problems of the region
- computer-aided design of transport and energy systems
- simulation systems for power plants
- study of renewable energy resources distribution in the region
- study of hydrogen interaction with solids
Established in 2009

High-performance computing cluster and the system of data storage

The main aim is to support development of fundamental and applied research as well as to organize teamwork with other organizations
BOINC projects

- **SETI@home**
  - Analyze data using the certain algorithms

- **Docking@Home**
  - Simulate interaction of molecular models

- **FreeHAL@home**
  - Convert texts into facts

...
Cluster nodes, servers and desktop PCs

The aim is to provide additional computational resources for data-parallelized applications

Applications are unique and serve specific needs of different users

Applications of a user change from time to time
Remote job submission and monitoring

- **RBoinc (GPUGRID.net)**
  - Users submit jobs for the registered application

- **Legion**
  - Users submit tasks that can be divided into a number of BOINC workunits for the registered application

- **BOINC API**
  - Users submit batches of jobs for the registered application
- User's Application

- User's executable
- BOINC Wrapper (pre-compiled)
- Custom input template file
  - Number of input files
  - Logical filenames
  - Time/Memory/Disc usage estimates
  - ...
- Custom output template file
  - Number of output files
  - Logical filenames
  - ...
<table>
<thead>
<tr>
<th><strong>Short description:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executable file:</strong></td>
<td>(compiled with -static option)</td>
</tr>
<tr>
<td><strong>Zip archive of additional files:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Input file(s) name(s):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Zip archive of input files:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Output file(s) name(s):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Time estimate:</strong></td>
<td>30 minutes</td>
</tr>
<tr>
<td><strong>Memory estimate:</strong></td>
<td>16 Mb</td>
</tr>
<tr>
<td><strong>Disc usage estimate:</strong></td>
<td>16 Mb</td>
</tr>
<tr>
<td><strong>E-mail address:</strong></td>
<td></td>
</tr>
</tbody>
</table>

[Send] [Reset]
Adding a new application

- User's executable and I/O parameters (PHP)
- Registration of the application (PHP + shell scripts)
  - edit `project.xml`
  - run `xadd`
  - create app directory
  - run `update_versions`
  - add assimilator and validator
  - update DB for user's applications
- Job submission (PHP + shell scripts)
  - Generate XML files for I/O templates
  - run `create_work`
Retrieving the results

- Validation
  - Sample trivial validator

- Assimilation
  - Write output files to the temporary directory
  - When all workunits are assimilated, set application status to "Ready but not sent" in DB for users applications

- Returning to the user
  - Check for "Ready but not sent" applications
  - Zip the output files and send them to user
  - Set application status to be "Ready and sent" in DB for users applications
Main drawbacks and plans

- Security issues
- User's executable for different platforms
  - Upload source code and compile it at server/clients?
- Error handling is not fully implemented
- Job monitoring is not fully implemented
- Applications have equal priorities
More info at

Contact
nikitina@krc.karelia.ru
ivashko@krc.karelia.ru