

POZNAŃ **SUPERCOMPUTING AND** **NETWORKING** **CENTER**



Summer Projects

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Applications Department

Summer Projects

1. Automated code review of SMOA Services
2. Integration with PL-grid accounting infrastructure - bat_updater module
3. PBS DRMAA – implementing „triggered” mode
4. DRMAA implementation for SLURM

Automated code review of SMOA Services

- Check SMOA Core library with automated core review software
- Flawfinder
 - Output: 1858 lines
 - Tips for programmers
- Rough Auditing Tool for Security – RATS
 - Output: 593-791 lines
 - Tips for programmers
- Splint
 - Output: 2909 lines
 - Very „strict”

Integration with PL-grid accounting infrastructure - bat_updater module

- SMOA Computing module which allows publication of resource usage data
- Transport layer based on JMS(Java Messaging Service) and uses opensource implementation of ActiveMQ called Apache ActiveMQ CPP
- C wrapper interface composed of three functions (activemq_connect, activemq_send_message, activemq_disconnect)
- Generate XML and send

Integration with PL-grid accounting infrastructure - bat_updater module

```
<?xml version="1.0" encoding="UTF-8"?> <site name="psnc-smoa-plgrid">
  <job>
    <batch_server>mich-laptop</batch_server>
    <job_id>10732.mich-laptop</job_id>
    <user>mich</user>
    <group>mich</group>
    <queue>batch</queue>
    <ctime>1285112777</ctime>
    <qtime>1285112777</qtime>
    <etime>1285112777</etime>
    <start>16518</start>
    <end>1285112868</end>
    <exec_host>
      <node>
        <nodename>mich-laptop</nodename>
        <cpu>0</cpu>
      </node>
    </exec_host>
    <cputime>0</cputime>
    <walltime>91</walltime>
    <mem>2547712</mem>
    <vmem>29581312</vmem>
    <estatus>0</estatus>
    <infrastructure>smoa</infrastructure>
    <grid_job_id>"368e7fb7-666f-467c-ab84-820804a0372d"</grid_job_id>
    <userDN>"(anonymous)"</userDN>
  </job>
</site>
```


PBS DRMAA – implementing „triggered” mode

Triggered mode allows DRMAA to acquire job-state changes events. This mode may be the only solution for many production clusters (e.g. reef.man.poznan.pl)

wait_thread	pbs_home	mode	Keep completed needed
0	Not set	Polling	Yes
1	Not set	Polling	Yes
1	set	triggered	no

Every log file line is composed of 6 fields:

FLD_DATE;FLD_EVENT;FLD_OBJ;FLD_TYPE;FLD_ID;FLD_MSG

PBS DRMAA – implementing „triggered” mode

- Example lines:

09/21/2010 13:42:25;0008;PBS_Server;Job;9288.mich-laptop;
Job deleted at request of mich@mich-laptop

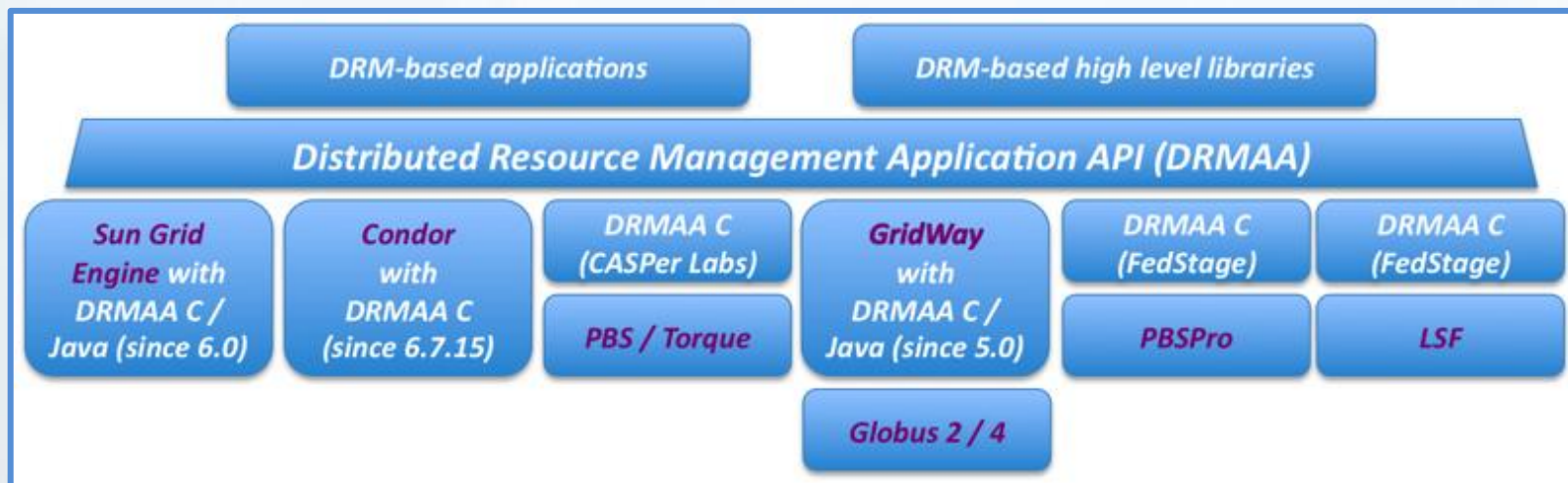
09/22/2010 00:06:23;0008;PBS_Server;Job;10496.mich-laptop;
Job Run at request of mich@mich-laptop

09/22/2010 00:06:28;0010;PBS_Server;Job;10496.mich-laptop;
Exit_status=0 resources_used.cput=00:00:00 resources_used.mem=0kb
resources_used.vmem=0kb resources_used.walltime=00:00:05

- PBS DRMAA in „triggered mode” passed official OGF DRMAA testsuite on Torque and PBS Pro systems.

What is DRMAA?

- Distributed Resource Management Application API
- 1.0 Grid Recommendation
- C Binding v1.0



Simple Linux Utility for Resource Management (SLURM)

- SLURM is an open-source resource manager designed for Linux clusters of all sizes.
- SLURM provides resource management on about 1000 computers worldwide, including many of the most powerful computers in the world:
 - Tera 100 at CEA with 140,000 Intel Xeon 7500 processing cores, 300TB of central memory and a theoretical computing power of 1.25 Petaflops. Europe's most powerful supercomputer.
 - Tianhe at The National University of Defence Technology (NUDT) with 6,144 Intel CPUs and 5,120 AMD GPUs. Debuting as China's fastest super computer with a peak performance of 1.206 Petaflops.
 - MareNostrum a Linux cluster at Barcelona Supercomputer Center with 10,240 PowerPC processors and a Myrinet switch

SLURM DRMAA implementation and testsuite

Input docs:

- DRMAA specification
- SLURM Manual
- Mapping of DRMAA interface on SLURM
- DRMAA implementation
- DRMAA testsuite
- 44/44 tests passed ;-)
- DRMAA1.0-compliant but a few functions are administrators only ;-(
- On non-administrator account 40/44 tests passed