Challenges, problems and solutions for institutional desktop grids

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Overview

UoW Desktop Grid
The University of Westminster Local Desktop Grid connects laboratory PCs of the university into a BOINC based Desktop Grid infrastructure. It includes over 1900 registered machines over all the campuses.
Server Side

Debian packages

WminDG uses .deb packages compiled by SZTAKI optimized for local Desktop grids.

deb http://www.desktopgrid.hu/debian/ squeeze szdg

The 3G-Bridge middleware run as BOINC daemons:

```
DAEMON pid status lockfile disabled commandline
1 23477 running locked no feeder -d 3
2 23479 running locked no transitioner -d 3
3 23481 running locked no file_deleter -d 3
4 23483 running locked no 3g-bridge
5 23487 running locked no wssubmitter
6 23504 running locked no wsmonitor
7 23508 running locked no validator_autodock -app autodock_vina
...```
WminDG uses a special submitting interface called 3G-Bridge. This middleware was been developed by SZTAKI (Hungary) within the EDGES and EDGI European projects.

The bridge is able to connect lots of different grid technologies. It has interface for EGI (Globus & gLite) infrastructure, interface for cloud submission, interface portal based submission, etc.
Using Different projects (not any more)

WminDG used different BOINC projects for licensed and unlicensed applications.

Labs with the licensed software installed were subscribed to a particular project.
Users

WminDG uses "BOINC users" to distribute different applications to specific labs, specially for licensed apps.

Ex: Those licensed Desktops able to run a particular rendering app are registered in the project as user "render".
**Boinc Clients**

**ZENworks**

Every single desktop in the University is managed using ZENworks.

BOINC clients are preconfigured in a so called ”ZEN object”. We customize the version and parameters of the BOINC client depending on the lab it’s going to be installed. All the rest is done automatically.
Credits, Statistics

No Credits

As our desktop grid is formed only by the University computers, we do not grant credits.

We also do not spend effort in decorating the apps with progress bars, we neither take care about large input/output sizes.
Green IT

As the majority of PC labs are used by students, the policy is to completely switch off BOINC during class time.

We also have environmental policies and scripts that switch off the machines if there are no BOINC jobs running.
Quality of Service

No Tail problem
In the last months, thanks to Speculos, developed within EDGI. We have added QoS to the DG.

The system monitors the remaining results and launches instances on our own cloud infrastructure (Openstack) when 90% are over.
This technology is still in testing phase.
WS-PGRADE portal

Is a web portal capable of submitting jobs in BOINC and many other grids. Has been developed by the SZTAKI, Hungary in collaboration with many partners in the framework of European projects such as EDGI, SCI-BUS, SHIWA …

It does communicate with desktop grids using the 3G-Bridge
wsclient is a command line tool. Some WminDG users prefer this method to submit their jobs, this way they can also integrate it with their own scripts.

UoW developed its own scripts based on this tool and they have been used by some scientists.

```bash
COMMAND="wsclient --mode=add --endpoint=${WSSUBMITTER_URL}"
for i in ${INPUT_LOGICAL_NAMES}
do
  FILE_NAME="${i}_${EXP_NUMBER}_${WU_NUMBER}"
  ln -s 'pwd'/${i} $1
  URL="${BASE_URL}/${APPLICATION_NAME}_${EXP_NUMBER}/${FILE_NAME}"
  COMMAND="${COMMAND} --in=${i}=${URL}"
done
```

...
WminDG apps ex

Mentalray
Used in teaching to render student projects
Specific testbed of 40 PCs fully licensed for the AutoDesk package
Custom user interface in the WS-PGRADE portal
Browse and upload the project zip file
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WminDG apps ex

AutoDock Vina
Outputs possible ligands of a family 38 mannosidase.
Approximately 180,000 small molecules have been docked consuming one computer year of processing within a couple of weeks.
exit(0);