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Parallel Programming and Multi-Cluster Execution Using "Grid Library/Service Applications"

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With a forward look to future evolution, discuss the issues you have encountered (or that you expect) in using the EGEE infrastructure. Wherever possible, point out the experience limitations (both in terms of existing services or missing functionality)

This approach enables much easier user PROGRAMMING of the Grid,
as the
LAPIs (Library/Service Application Programming Interface) enable
a coherent
and consistent use of a huge variety of algorithms and complex
programmable
executioners executing in parallel on different parts of the Grid
(enabling also
use of very specific equipment, e.g. vector processors, quantum
processors...).
The main Application would actually be just a "driver" for the
necessary
algorithmic "applications"

Describe the scientific/technical community and the scientific/technical activity using (planning to use) the EGEE infrastructure. A high-level description is needed (neither a detailed specialist report nor a list of references).

The availability of the Grid infrastructure enables a wide new
area of scientific,
technical and other problems to be solved using Grid
Applications. It is obvious
that this infrastructure can be used by scientists, researchers,
artists and
others in any field of human creative effort.

Report on the experience (or the proposed activity). It would be very important to mention key services which are essential for the success of your activity on the EGEE infrastructure.

A "Library Application" mentioned above is actually a specific,
non-user
community targeted (or multi-user community targeted) algorithm
or algorithmic
system gridified in such a way that it's primary purpose is not
to be used by any
human user (although it is open to such uses, too), but to be
used as a
selfstanding grid "Application" (note the quotes) which is
actually a sub-
programme (sub-application) of the user Application, i.e. the

end-user
Application uses the "Library Application" in a very similar way
a computer
programme uses programme libraries. However, the scope of the
"Library
Application" is much wider, as it does not provide specific
functions, but a very
complex algorithm execution, including, where necessary, high level
programibility (e.g. a pattern recognition system, or a
mathematical system).
"Service Applications" are specific services (e.g. a quantum
random number
generator) wrapped up into a "Library Application".

Describe the added value of the Grid for the scientific/technical activity you (plan to) do on the Grid. This should include the scale of the activity and of the potential user community and the relevance for other scientific or business applications

However, all of the mentioned communities are, in this moment of
time, limited
to the use of already gridified applications. Development of a
new Grid
application is a very tedious and time/effort/money consuming
process. A
common approach is to coordinate the development, from an initial
idea,
through the development of algorithms up to the gridification
self, between the
scientists/researchers/artists who necessitate the use of the
emerging
application and the computer experts, which have to implement it.
This process
usually, after a lot of strain, results in an Application, i.e. a
gridified programmed
system of algorithms, usable for a more or less, but nevertheless
very limited,
specific set of data and results. A novel approach is being
proposed, which we,
at the RBI, started implementing, where not fully fledged
Applications are being
developed, but gridified "Library Applications" and "Service
Applications".

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