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G-ICS: Grid –Instrument Control System

Friday 11 May 2007 11:40 (20 minutes)

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 G-ICS is relevant for astronomers who use (or plan to use) the Grid to run remote observations from their home Institutes making use of remote observing facilities (Telescopes and related instrumentation). The G-ICS allows to configure the astronomical instrumentation as a new embedded resource in Grid. Astronomers may submit jobs to accomplish tasks like retrieving scientific and telemetric data under acquisition in quasi-real-time and sending requests to change the instrumentation status.

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.

To support the remote monitoring/control of astronomical (but more generally scientific) instrumentation, a Grid infrastructure must be G-ICS enabled, that is the underlying middleware was modified in some of their components, mainly the GRAM and the GIS. The GRAM is extended in a way that the Job Manager is joined by a ICSC (Instrument Control System Connector) Manager that takes charge of jobs whose target is the remote monitoring/control of instrumentation. The ICSC Manager activates when needed a specific ICS instance for any instrument to monitor/control. Being instruments a new resource of the Grid like a CPU or a storage space, a set of meta-data characterizing this kind of resource have to be defined and fed to the GIS so that users are able to discover instrument resources via the RB. The solution proposed for instruments is similar to what has been done for databases in Grid. Some work was already done on LCG-based Grids; we plan to port the same solution in gLite too.

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)

The current version of the EGEE Grid middleware does not support instruments as embedded resources in Grid, but the porting of the G-ICS in the current LCG-based production Grid and in gLite is in our planning. We don't expect particular problems from this point of view. At present however it is difficult for us to say whether and when the G-ICS technology might be ported on the EGEE Grid infrastructure.

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

People maintaining observing facilities (telescopes and related instrumentation) may resort to G-ICS enabled Grids to support the concepts of remote monitoring/control without the need of developing dedicated systems from their own. The Grid already supplies the underlying technology, once a Grid node is installed at the observing facility and the astronomer has access to a Grid-UI. There are no limitation on the number of telescopes and/or instruments a single G-ICS enabled Grid can support. Any observing facility, moreover, may be gridified in this way, provided that a Grid driver is written for the specific telescope and/or instrument, so the G-ICS may be beneficial for a huge community of users distributed worldwide. G-ICS allows the porting in Grid any kind of scientific instruments (i.e. networks of sensors) and this makes it suitable not only for astronomers but for any other scientific community and to carry out tasks like the environment quality monitoring.

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