

# Connecting the LOFAR telescope to the GRID

*Wednesday 9 May 2007 17:30 (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).**

LOFAR consists of thousands of sensors (antennas) interconnected through fiber connections. The LOFAR telescope is centred in the Netherlands, but remote antenna stations are being built, or considered to be built, in a number of countries across Europe. The LOFAR user community consists of Radio astronomers across the world accessing the LOFAR system and scientific data through science centers. The opportunities of the seemingly close match to the Grid infrastructure will be explored.

**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.**

Initiatives are taken to connect the LOFAR telescope to the GRID. The success will depend on the reliability, flexibility, and scalability of the resources. The central LOFAR system can only allow for a time/space limited buffer for scientific data before it being distributed to science data centers. For the scientific user, GRID resources will have to provide a secure, and flexible environment for astronomical data analysis without exposure to technical details of the specific facility that is being used. The computational environment should allow for transparent deployment of, partly legacy, applications that expect a specific environment. The large quantities of data necessitate an intelligent management of data distribution, minimizing large data transfers.

**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)**

LOFAR challenges for GRID:  
Being able to provide scalable and transparent storage taking

into account  
storage of proprietary data.  
Computational facilities providing an environment where diverse  
astronomical  
applications run efficiently.  
Transparently and intelligently couple storage to computational  
facilities  
avoiding large data transfers.  
Reliable and efficient data distribution mechanism preventing a  
“buffer overrun”  
of the LOFAR central systems.  
Realtime processing of Tb/s datastreams.

**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**

The aspects of LOFAR well suited to be supported by a GRID infrastructure are  
setting up scientific data centers and providing computational facilities for  
scientific analysis of the data provided by these data centers.  
Current  
prognosis for the LOFAR long term storage capacity is that it will require a  
growth of Petabytes per year. Even simple operations on such amounts of data  
will provide a challenge for computational resources. The data access patterns  
depend strongly on the scientific applications, and requirements for the storage  
and computational resources will be diverse. Furthermore, the astronomical  
scientist in general should not worry about the technical implications of these  
requirements and a transparent GRID based framework could provide the  
appropriate means for scientists to be able to concentrate on the astronomical  
aspect of their research. For international collaborations, another case to be  
considered is the realtime data reduction of (international) datastreams.

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