



Contribution ID: 34

Type: Oral contribution

International Telecommunication Union Regional Radio Conference and the EGEE grid

Wednesday 1 March 2006 15:15 (15 minutes)

The Radiocommunication Bureau of the ITU (ITU-BR) manages the preparations for the ITU Regional Radio Conference RRC06 to establish a new frequency plan for the introduction of digital broadcasting (band III and IV/V) in Europe, Africa, Arab States and former-USSR States. During the 5 weeks of the RRC06 Conference (15 May to

16 June 2006) delegations from 119 Member States will negotiate the frequency plan.

The frequency plan will be established in an iterative way. During week time at the RRC06 administrations will negotiate and submit their requirements to the ITU-BR, which will conduct over the subsequent weekend all the calculations (analysis and synthesis) that would result in assigning specific frequencies for the draft plan.

The output of the calculations will be the input for negotiations in the subsequent week, with the last iteration constituting the basis for the final frequency plan.

In

addition, partial calculations are envisaged for parts of the planning area in between two global iterations (for the entire planning area).

For obtaining optimum planning of the available frequency spectrum, two different software processes have been developed by the European Broadcasting Union and they are run in sequence: compatibility assessment and plan synthesis. The compatibility assessment (which is very CPU demanding and can be run on a distributed infrastructure) calculates the interference between digital requirements, analogue broadcasting and other services stations. The plan synthesis assigns channels to requirements which could share the same channel.

The limited time to perform the calculation calls for the optimization of the process. The turnaround time to provide a new set of results would be a critical factor for the success of the Conference. The EGEE grid will greatly enhance the ITU-BR available resources allowing better serving the Conference. The grid infrastructure will complement the client-server distributed system developed within the ITU-BR, which has been used for the first exercises. In addition, the possibility

to perform faster calculations could improve the efficiency of the negotiation (for example, giving preliminary results during the negotiation weeks themselves or allow extra quality checks and compatibility studies).

The compatibility assessment consists in running a large number of jobs (some tens of thousands). Each job is basically the same application running on different datasets representing the parameters of radio-stations. One should note that the execution time varies by more than 3 orders of magnitudes (the majority of jobs needs only few seconds but few jobs require many hours) depending on the input parameters and cannot

be completely predicted. To cope with this situation we decided to use a client-server system called DIANE that allows run-time load balancing, access to

heterogeneous resources (Grid and local cluster at the same time) and a robust infrastructure to cope with run-time problems. In the DIANE terminology, a job is defined as a “task”. DIANE allows using in the most effective way the available resources since each available worker nodes asks for the next task: while a long task will “block” a node, in the mean time the short tasks (the large majority) will flow through the other nodes.

We have already demonstrated to be able to perform the required calculations on the EGEE/LCG infrastructure (in the first tests, we have run with a parallelism of the order of 50, observing the expected speed-up factor) and we are preparing, in close collaboration with CERN, to use these techniques during the Conference later this year. The EGEE infrastructure does not only enable us to give the adequate support for an important international event but, in addition, the substantial speed-up already observed opens the possibility to allow faster and more detailed studies during the Conference. The technical improvement gives the possibility to provide a better service and technical data to the Conference’s delegates.

The present set up is well suited for the foreseen application. The possibility to access resources from the grid and corporate resources (which we are not yet exploiting) is very appealing and should be interesting for other users. The possibility to describe and execute more complex workflow (presently we are using the system to execute independent tasks in parallel) could increase the interest for the tools we are currently using.

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Session Classification: 1c: Earth Observation - Archaeology - Digital Library

Track Classification: Earth Observation - Archaeology - Digital Library