Research Makes Mount Etna Sing!

GÉANT2 and ALICE-RedCLARA networks supporting data-sonification to extend research to Ecuador's volcanoes

9th August 2006: Cambridge, United Kingdom – Predicting eruptions will become easier now scientists are using technology to translate the patterns in a volcano's behaviour into sound waves. The EU funded "Enabling Grids for E-sciencE" (EGEE) and the "E-Infrastructure shared between Europe and Latin America" (EELA) projects, which are already investigating volcano sonification at Mount Etna, Sicily, are using the GÉANT2 and ALICE-RedCLARA networks to further extend this important study to include Ecuador's Tungurahua volcano.

The research project, which brings together experts from Europe and Latin America, digitally collects geophysical information on seismic movements before using data sonification to transform them into audible sound waves, which can then be 'scored' as melodies. The resulting 'music' is then analysed for patterns of behaviour and used to identify similarities in eruption dynamics and so predict future activity.

The software used for sonification was first developed by Dr. Domenico Vicinanza at the Italian National Institute of Nuclear Physics (INFN) for use at Mount Etna, the tallest volcano in Europe. Following the initial work, Dr. Vicinanza and a team of scientists, led by Prof. Roberto Barbera from the University of Catania, are now collaborating with colleagues in Ecuador to study the Tungurahua volcano, transferring data across GÉANT2 to the ALICE-RedCLARA network using a transatlantic 622 Mbps connection. The Ecuadorian National Research and Education Network (CEDIA) is responsible for the connection to the scientists based at Tungurahua itself.

"Through expanding this research to include Latin America's volcanoes we are hopeful we can build on and further develop the extensive data and information we have already obtained from the studies at Mount Etna," said Prof. Barbera, Technical Coordinator of the EELA project. "Data sonification can be considered the acoustic counterpart of data graphic visualisation and is key to expanding our knowledge of volcanic seismic patterns to gain a deeper understanding of volcanic activity, especially when this activity precedes eruptive phenomena." continued Dr. Vicinanza, from CERN, the world's largest particle physics laboratory.

Dai Davies, General Manager of DANTE, said: "This project is contributing new knowledge to volcanic research and we are delighted to be providing the networking support needed for the international exchange of scientific learning. The ability to be able to translate geophysical data into sound waves is not only exciting but could prove vital to predicting future eruptions, benefiting everyone in these regions."

GÉANT2 is the world's most advanced research and education network and is co-funded by Europe's National Research and Education Networks (NRENs) and the European Commission. Managed by research networking organisation DANTE, it supports a community of over 30 million users in Europe. The ALICE (America Latina Interconectada Con Europa) project was set up in 2003 to develop the RedCLARA network, which provides IP research network infrastructure within the Latin American region and towards Europe. Also managed by DANTE, it has 4 European and 19 Latin American partners, including the Latin American research networking association CLARA.

EGEE operates a service Grid infrastructure, which is used to share computing and storage resources across more than 200 sites in 40 countries. Running on top of the GÉANT2 network, it facilitates collaboration between researchers at the various institutions and geographical sites involved.

EELA is EGEE's counterpart in Latin America, and creates a digital bridge between grid infrastructures in both regions, utilising the ALICE-RedCLARA infrastructure as the underlying network. EELA is run by a consortium of 21 partners from 10 countries (7 in Latin America and 3 in Europe).

To listen to the melody created by Mount Etna visit:
http://grid.ct.infn.it/etnasound/page4/page8/etna.aif

To listen to the melody from Tungurahua visit:
http://grid.ct.infn.it/tungurahuasound/

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About GÉANT2
GÉANT2 delivers the next generation research and education network for Europe. With over 30 million users in 34 countries across the continent, GÉANT2 offers unrivalled geographical coverage, high bandwidth, innovative hybrid networking technology and a range of user-focused services. Its network footprint maps more than 50,000 km and its extensive geographical reach interconnects with other world regions, enabling global research collaboration.GÉANT2's comprehensive programme of research and service development keeps Europe at the forefront of global research.
GÉANT2 is co-funded by the European Commission under the Sixth Research and Development Framework Programme. The project partners are 30 European National Research and Education Networks (NRENs), TERENA and DANTE. It is co-ordinated by DANTE, the research networking organisation that plans, manages and builds research networks all over the world. For more information visit www.geant2.net

About ALICE:
The ALICE project has created RedCLARA –the first regional research and education network for Latin America. It not only connects regional researchers to each other, but it also connects them with their counterparts in Europe via GÉANT2, the world's most advanced international research and education network, for increased collaboration. RedCLARA went live in 2004 and has stimulated the development of many National Research and Education Networks in the region. Funding for the ALICE project has been extended until March 2007. Managed by DANTE, it has 4 European and 19 Latin American partners, including the Latin American research networking association CLARA.
For more information visit www.dante.net/alice.

About EGEE:
The Enabling Grids for E-sciencE project brings together scientists and engineers from more than 90 institutions in 32 countries world-wide to provide a seamless Grid infrastructure for e-Science that is available to scientists 24 hours-a-day. Conceived from the start as a four-year project, the second two-year phase (EGEE-II) started on the 1st of April 2006, and is funded by the European Commission. For more information visit www.eu-egee.org.

About GILDA:
GILDA (the Grid INFN Laboratory for Dissemination Activities) is a virtual laboratory originally developed by INFN to disseminate/demonstrate the strong capabilities of grid computing. It presently comprise about 20 sites in 3 continents and it is currently adopted by EGEE and by many other EU Grid Projects related to EGEE to train new communities and to speed up the porting of new scientific applications on grid. For more information on GILDA visit https://gilda.ct.infn.it. For more information on Mount Etna sonifications carried out on GILDA and EGEE visit grid.ct.infn.it/etnasound/.

About EELA:
EELA (E-Infrastructure shared between Europe and Latin America) creates a digital bridge between grid infrastructures in Latin America and Europe. EELA is coordinated by CIEMAT (Spain) and includes several partners from Europe – CERN; CSIC, REDIRIS, UC and UPV (Spain), INFN (Italy) and LIP (Portugal) - and Latin America –CLARA; UNLP (Argentina), CEDERJ, RNP, UFF and UFRJ (Brazil), REUNA, UDEC and UTFSM (Chile), CUBAENERGIA (Cuba), UNAM (Mexico), SENAMHI (Peru) and ULA (Venezuela). More at http://www.eu-eela.org

About DANTE:
DANTE is a non-profit organisation whose primary mission is to plan, build and manage research and education networks. Established in 1993, DANTE has been fundamental to the success of pan-European research and education networking. DANTE has built and operates GÉANT2, the most advanced research and education network in the world. GÉANT2 provides the data communications infrastructure essential to the success of many research projects in Europe.

DANTE is involved in worldwide initiatives to interconnect countries in other regions to one another and to GÉANT2. DANTE currently manages initiatives focused on the Mediterranean, Latin American and Asia-Pacific regions through the EUMEDCONNECT, ALICE-RedCLARA and TEIN2 (Trans-Eurasia Information Network) projects respectively. For more information, please visit www.dante.net**.**

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