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International Fusion Energy Research Centre and GÉANT collaboration paves data highway for research

As of 9 April 2013 GÉANT, the world's leading high-speed research and education network managed and operated by DANTE in Cambridge, UK, will be providing data links to the International Fusion Energy Research Centre (IFERC), in Rokkasho, Japan. IFERC hosts the Helios supercomputer, a system with a compute power exceeding 1 PFlops and attached to a storage capacity of 50 PB. The Helios supercomputer is provided and operated by the French Alternative Energies and Atomic Energy Commission (CEA), France and is a Fusion for Energy (F4E) resource.

GÉANT is supplying a 10 Gbps (10 Gigabits per second) link to connect Helios with scientists involved in ITER and DEMO, the demonstration fusion reactor which is considered the follow-on project of ITER.

It is hoped, after the first fusion plasmas of ITER in Cadarache, France, planned for 2020 and beyond, that DEMO, an industrial demonstration fusion reactor, will lead to full-scale fusion energy reaching the commercial market in the second half of the century.

Massive data sets

HELIOS is producing vast amounts of data, which need to be shared with scientists all over the world. Via the Japanese National Research and Education Network (NREN) SINET, IFERC is connected to the pan-European GÉANT network, and to all European NRENs, like RENATER, DFN, SWITCH, JANET and many others), supporting the research activities for fusion in Europe.

The GEANT-provided link is a 10Gbps connection between Geneva and Washington, matching the 10Gbps link between Japan and Washington provided by SINET. It will enable researchers in Europe to access this dedicated supercomputer in Japan. It may eventually be used to complement also the network resources allocated to other large scale projects, such as the CERN LHC experiment.

Roberto Sabatino Business Solutions consultant says: "The combination of major new scientific projects like IFERC and the use of supercomputers like Helios is creating an explosion of data for which we need to be ready. The provision of a 10Gbps link is a first and crucial step to support the data networking needs in the global search for cleaner, sustainable energy and to assist scientists in their ground-breaking work."

Transporting high-volumes of traffic

Together with ever-growing data sets, greater collaboration in areas such as energy and genetics is driving a growing demand to access shared central databases of information across research disciplines, exponentially increasing network traffic. In the past, the most practical method for transferring bulk data from geographically dispersed clusters and end users was to physically ship

disks by courier. With high speed networks such as GÉANT, data from many different sources can quickly be shared and analysed leading to accelerated results.

Europe's vision for - sustainable energy

The ITER project is funded by and run by seven parties – Europe (contributing 45% of the cost), India, Japan, China, Russia, South Korea and the US. DEMO studies are carried out by individual ITER members, and in the case of Japan and Europe, jointly in the IFC, in the framework of the Broader Approach Agreement. The investment in fusion research is in line with the EU's focus for Horizon 2020 to find new and convincing solutions to the societal challenge of secure, clean and efficient energy. GÉANT is seen as an essential component in driving European ICT and for Europe to remain competitive in dealing with society's grand challenges.

Susana Clement Lorenzo, F4E Group Leader for IFC says: "Helios users are running codes ranging from fundamental physics in hot ITER plasmas to technology and engineering calculations so as to build components in very challenging environments as expected in DEMO. Supercomputers are crucial in solving these complex problems and good data communication channels such as the high-speed GÉANT network can provide the essential links to help scientists all over the world to analyse their findings. Ultimately, all these initiatives will bring us a step closer to fusion as a potential energy source."

Big science reliant on high-speed networks

IFC joins many other big science projects supported by GÉANT which are changing the way the world collaborates. Examples include CERN's Large Hadron Collider and global projects addressing climate change, medical diagnosis, bioinformatics and deep space research.

To see a short clip on the Helios supercomputer click [here](#)

To see a short clip on GÉANT click [here](#)

Background information

GÉANT

GÉANT is the high speed European communication network dedicated to research and education. In combination with its NREN partners, GÉANT creates a secure, high-speed research infrastructure that serves 40 million users in over 8,000 institutions across 40 European countries. Building on the success of its predecessors, GÉANT has been created around the needs of users, providing flexible, end-to-end services that transform the way that researchers collaborate. GÉANT is at the heart of global research networking through wide ranging connections with other world regions, underpinning vital projects that bridge the digital divide and benefit society as a whole.

Co-funded by the European Commission under the EU's Seventh Research and Development Framework Programme, GÉANT is the e-Infrastructure at the heart of the EU's European Research Area and contributes to the development of emerging Internet technologies. The project partners are 32 European National Research and Education Networks (NRENs), TERENA and DANTE. GÉANT is operated by DANTE on behalf of Europe's NRENs. For more information, visit www.geant.net

DANTE

DANTE is a non-profit organisation, coordinator of large-scale projects co-funded by the European Commission, and working in partnership with European National Research and Education Networks

(NRENs) to plan, build and operate advanced networks for research and education. Established in 1993, DANTE has been fundamental to the success of pan-European research and education networking. DANTE has built and operates GÉANT, which 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 the other regions to one another and to GÉANT. DANTE currently manages projects focussed on the Mediterranean, Asia-Pacific, Sub-Saharan Africa and Central Asia regions through the EUMEDCONNECT, TEIN, ORIENTplus, AfricaConnect and CAREN projects respectively. For more information, visit www.dante.net

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Fusion for Energy (F4E):

Fusion for Energy (F4E) is the European Union's Joint Undertaking for ITER and the Development of Fusion Energy. The organisation was created under the Euratom Treaty by a decision of the Council of the European Union in order to meet three objectives:

F4E is responsible for providing Europe's contribution to ITER, the world's largest scientific partnership that aims to demonstrate fusion as a viable and sustainable source of energy. ITER brings together seven parties that represent half of the world's population – the EU, Russia, Japan, China, India, South Korea and the United States.

F4E also supports fusion research and development initiatives through the Broader Approach Agreement, signed with Japan – a fusion energy partnership which will last for 10 years. Ultimately, F4E will contribute towards the construction of demonstration fusion reactors.

F4E is established for a period of 35 years from 19 April 2007 and is located in Barcelona, Spain.

For more information visit:

<http://fusionforenergy.europa.eu>

<http://www.youtube.com/user/fusionforenergy>

<https://twitter.com/fusionforenergy>

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