

# World's first intercontinental 100 Gbps link for research and education demonstrated at TERENA networking conference

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Six of the world's leading research and education networks and two commercial partners today demonstrated for the first time a Transatlantic 100 gigabits-per-second (Gbps or one billion bits per second) transmission link for research and education between North America and Europe during the TERENA Networking Conference 2013 (TNC2013), held in Maastricht, The Netherlands. These demonstrations showcased emerging technologies and advanced applications for science, research and education.

The 100 Gbps link, called the Advanced North Atlantic 100G [Pilot project](#) (ANA-100G) will be used for engineering and testing the new transmission link, applications, resources, monitoring techniques and advanced technologies such as software-defined networking. The testing will be between as many as four open exchange points, including MAN LAN in New York City and NetherLight in Amsterdam for at least 12 months following the conference. These efforts will determine the operational requirements needed to effectively run 100 Gbps wavelengths between North America and Europe to meet the growing demand of specialized research organizations.

"This achievement shows that research and education networks are at the forefront of innovation, thereby empowering the most advanced research by universities and [research institutions](#) worldwide," said Erwin Bleumink, [chief executive officer](#) of SURFnet – the local organizer of

TNC2013. "The impact of this development however will also be seen outside academia and help stimulate the [global economy](#)."

The R&E networks participating in the project are Internet2, NORDUnet, ESnet, SURFnet, CANARIE, and GÉANT. Ciena is also supporting the ANA-100G pilot. Ciena is providing photonic equipment, including the recently released subsea version of the 100 Gbps WaveLogic 3 transponder. Furthermore, Juniper loaned equipment that enables some of the eye-catching demonstrations. The leaders' announced their intentions for the pilot at the recent Internet2 Annual Meeting.

Demonstrations of the intercontinental 100 Gbps link include big data transfers between Maastricht and Chicago, Illinois taking a few minutes rather than many hours over the public Internet; the "First European ExoGENI at Work" demonstration between the University of Amsterdam and the Renaissance Computing Institute in North Carolina; and "How many modern servers can fill a 100Gbps Transatlantic Circuit?"

ExoGENI is a testbed for networking and cloud computing technologies. It is funded through the National Science Foundation's Global Environment for Network Innovation (GENI) project to develop and deploy integrated network testbeds. The demonstrations also include the use of multipath routing of network information, OpenFlow software-defined networking technology and other advanced technology applications. In the "How many modern servers can fill a 100 Gbps Transatlantic Circuit?" demonstration, experts show that with the proper tuning and tool, only two hosts on each continent can generate almost 80 Gbps of traffic. ESnet's new "iperf3" throughput beta measurement device combines the best features from other tools such as iperf, nuttcp, and netperf.

This first Transatlantic 100 Gbps link for R&E will advance high-end projects such as the experiments at the Large Hadron Collider in Switzerland, the ITER fusion reactor in France and similar international programs. The 100 Gbps Transatlantic connection reflects two trends in scientific research: science is increasingly data driven with datasets from large-scale experiments at the tera-scale level, and these experiments are increasingly carried out by international collaborations in which researchers around the globe expect immediate access to the datasets.

The operation of this ultra high-speed link across the Atlantic Ocean also illustrates how the close collaboration between research and education networks and the commercial sector continues to evolve, with the ongoing deployment of cutting-edge networking technologies that underpin groundbreaking, globally collaborative science and discovery.

**More information:** [www.internet2.edu/](http://www.internet2.edu/)

Provided by Internet 2

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