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Utilizing shared expertise in advanced photonic, leading edge hardware and high-performance computing, the team created a network application testbed using the 1650 km Cross Border Fiber between NetherLight and CERNLight, lit by SURFnet, connecting servers equipped with 40 Gigabit Ethernet network interface at the University of Amsterdam to remote servers with corresponding interfaces at GLIF 2010 in Geneva.

Network Setup

The Mellanox ConnectX-2 EN 40GbE is the first network interface that allows single stream ethernet transport far exceeding the common 10Gbps boundary limit. The achieved throughput is 26Gbps from CPU to CPU which is the practical limit of the PCI-E interface.

The network infrastructure is based on Ciena's Optical Multiservice Edge (OME) 6500 equipped with 40 GbE interfaces, which enables data speeds to be seamlessly upgraded from 10 Gbps to 40 Gbps.

Application Setup @Supercomputing 2010

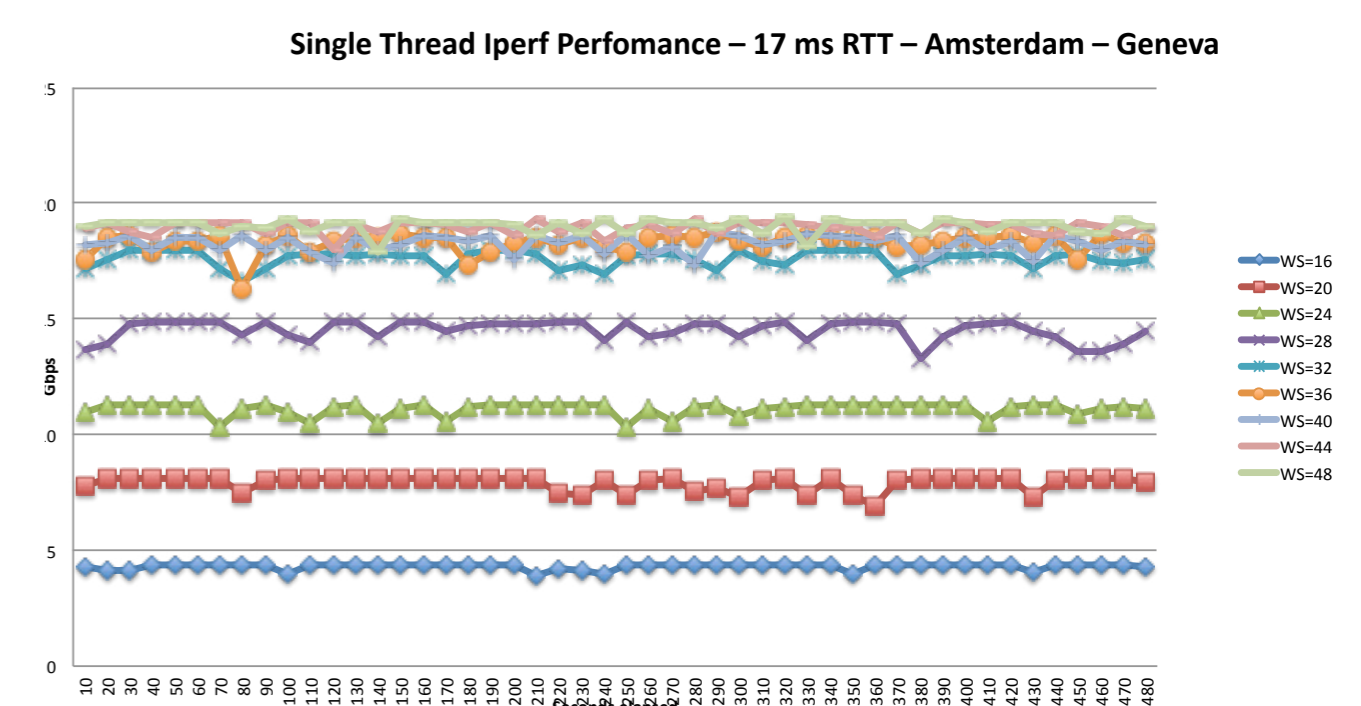
Following the succes of the GLIF 2010 demo, the Supercomputing 2010 setup demonstrates two high performance servers fully utilizing the 40Gbps clear channel WAN link between the Ciena Booth and the Dutch Research booth.

Going beyond 10 Gbps leads to new challenges in applications, operating system tuning and system architecture design as new bottlenecks appear.

Special attention needs to be given to the setup of multi-core machines in order to have the best I/O performance and maximize the network throughput. During the demo the PCI-E x8 2.0 interface of the network card is saturated when using UDP or TCP traffic.

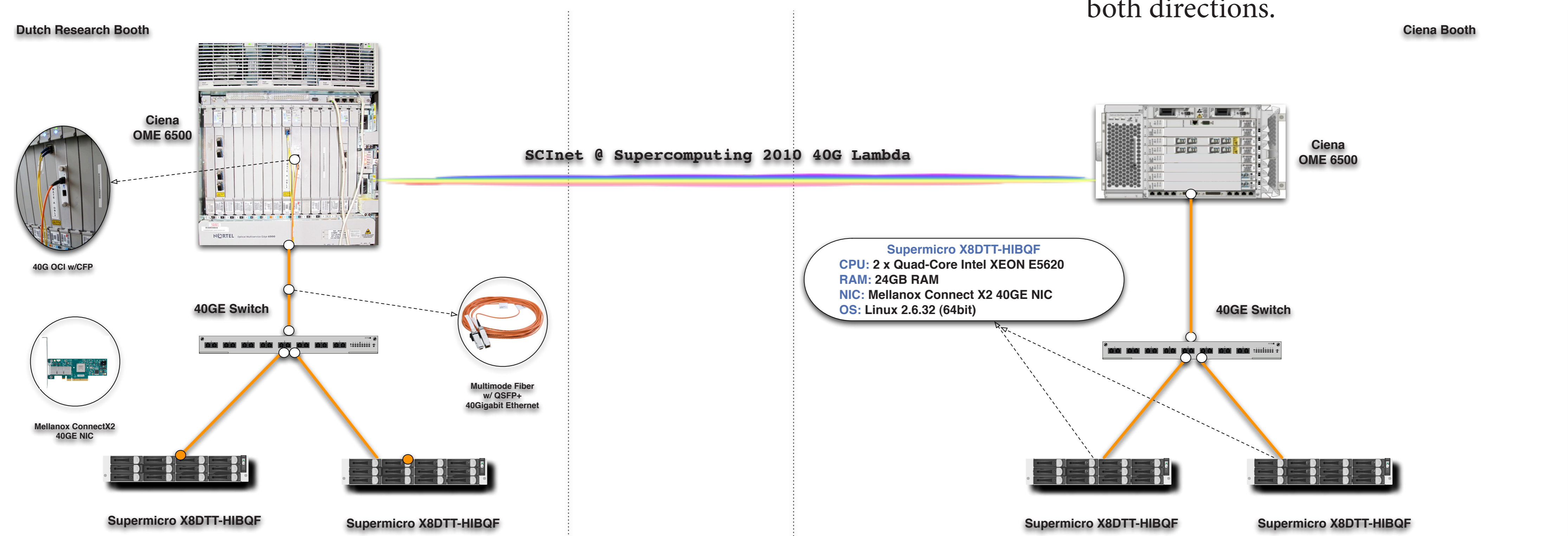
High Performance Node

Using a flexible I/O architecture, the Supermicro X8DTT with two quad-core Intel E5620 CPUs, allows extreme speeds of over 25 Gbps to be reached.



GLIF 2010 Demo

During the GLIF 2010 demonstration measurements showed constant throughput between the two remote ends. Using two servers over 70Gbps of aggregated traffic was exchanged in both directions.



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<http://science.uva.nl/research/sne>