Abstract

NASA in collaboration with a number of partners conducted a set of individual experiments and demonstrations during SC10 that collectively were titled "Using 100G Network Technology in Support of Petascale Science". The partners included the iCAIR, Internet2, LAC, MAX, National LambdaRail (NLR), NOAA and SCinet Research Sandbox (SRS) as well as the vendors Ciena, Cisco, ColorChip, cPacket, Extreme Networks, Fusion-io, HP and Panduit who most generously allowed some of their leading edge 40G/100G optical transport, Ethernet switch and Internet Protocol router equipment and file server technologies to be involved. The experiments and demonstrations featured different vendor-provided 40G/100G network technology solutions for full-duplex 40G and 100G LAN data flows across SRS-deployed single-mode fiber-pairs among the Exhibit Booths of NASA, the National Center for Data Mining, NOAA and the SCinet Network Operations Center, as well as between the NASA Exhibit Booth in New Orleans and the StarLight Communications Exchange facility in Chicago across special SC10-only 80- and 100-Gbps wide area network links provisioned respectively by the NLR and Internet2, then on to GSFC across a 40-Gbps link provisioned by the Mid-Atlantic Crossroads. The networks and vendor equipment were load-stressed by sets of NASA/GSFC High End Computer Network Team-built, relatively inexpensive, net-test-workstations that are capable of demonstrating >100Gbps uni-directional nuttcp-enabled memory-to-memory data transfers, >80-Gbps aggregate-bidirectional memory-to-memory data transfers, and near 40-Gbps uni-directional disk-to-disk file copying. This paper will summarize the background context, key accomplishments and some significances of these experiments and demonstrations.