SC06 Conference Volunteers Building Huge Network into Tampa Convention Center

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Supercomputing 2006

TAMPA, Fla.--(BUSINESS WIRE)--While many people attending conferences say they go for the networking opportunities and making connections, when the gathering is the world's largest conference on high performance computing and networking, connectivity is taken to an entirely different level.

When SC06, the premier international conference of high performance computing, networking, storage and analysis convenes Nov. 11-17 in the Tampa Convention Center, the center will be one of the best-connected sites on the planet. And, as a service for future conventions, much of the state-of-the-art networking infrastructure installed in the center will remain in place.

Every year, a team of volunteers works for more than a year to design, build and manage the SC conference network known as SCinet. For SC06, the SCinet team will be bringing in ten 10-gigabits-per-second (Gbps) network connections to the convention center. The combined network capability will be about 20,000 times that of the fastest residential Internet service provided by cable TV and telephone companies.

"This is a true team effort, from the 140 volunteers from around the country to the dozens of companies loaning us the necessary equipment to build the network," said Dennis Duke, a professor of physics at Florida State University and SCinet chair for the SC06 conference. "We started working on the network in October 2005 and have been working at it steadily since then."

The first big challenge was getting the network connections to downtown Tampa — the major network links operated by Level3 and Qwest ended about 12 miles from the convention center. Using fiber optic cable provided by Verizon, the SCinet team bridged the network from downtown Tampa to the convention center, where they started on the next challenge.

The Tampa Convention Center's internal network could not support the requirements of SC06, so the SCinet team installed about 64,000 feet —

more than 12 miles — of fiber optics and copper wire. In addition to providing two network drops for every meeting room, SCinet installed a high bandwidth infrastructure serving all parts of the exhibit areas, where more than 225 industrial and research exhibitors will showcase their latest systems, services and scientific achievements. SCinet is also providing wireless connectivity throughout the convention center.

Then they had one more bridge to cross. A number of the conference activities will be held in the Marriott Waterside Hotel, located 150 yards from the convention center. To provide the same network connectivity available in the convention center, SCinet built a 2.6 gigabit wireless bridge to the hotel using GigaBeam wireless equipment.

“While we rely on a lot of people and companies, I’m really proud of the role Florida LambdaRail has played in getting the National LambdaRail bandwidth from Atlanta to Tampa, which is absolutely essential for us,” Duke said.

The Florida LambdaRail, LLC (FLR) is leading the SCinet wide area network team in its delivery of over 100 Gbps of wide area network connectivity to the Tampa Convention Center. Ten 10 Gbps circuits will connect attendees and exhibitors via SCinet to key network connecting points in Chicago (Abilene), New York City (Abilene), Washington, D.C. (ESnet), Houston (National LambdaRail-PacketNet1), Atlanta (NLR-PacketNet), Baton Rouge (NLR FrameNet), Jacksonville (NLR Framenet), Miami (AMPath) and Chicago (UltraLight), extending the network reach both nationally and internationally.

FLR wave services are used to transport NLR, Atlantic Wave, Florida’s Research and Education Network (FLRNet) and UltraLight to carrier facilities in Tampa. Abilene and ESnet network services are carried to Tampa over Qwest facilities. These 10 lambdas are then transported to the Tampa convention center via DWDM systems from Ciena, Cisco and Nortel managed by the SC06 WAN team. In addition, Qwest and FLR are providing commodity Internet services for all SC06 participants.

The effort drew on the talent of engineers from Level3, Qwest, FLR, University of Florida, University of West Florida, Florida State University, Florida International University, University of South Florida, University of Wisconsin, NLR, CENIC, Abilene, ESnet, Atlantic Wave, UltraLight, Verizon, Cisco, Spirent, Nortel and Ciena.

Once the network is fully operational in November, SC06 attendees will push it to its limits, testing new technologies, flooding it with data and then measuring every aspect of the network’s performance. Here are two of the conference network highlights:

Bandwidth Challenge

At every SC conference since SC2000 in Dallas, teams of scientists and engineers have competed in the Bandwidth Challenge to see who could make the most of the huge bandwidth provided by SCinet. And while no group has achieved the unstated goal of flooding the network to the breaking point, each year has seen creative applications which move record amounts of data across the network.

This year's Bandwidth Challenge shifts its focus from that of "bandwidth heroes" to focus on "Bridging the Hero Gap" — that is, bridging the gap between what can be achieved by networking heroes and what can be achieved by the average researcher with access to high speed networks. The thinking behind this approach is that while 10 Gbps network links are becoming ever more prevalent; achieving data rates close to 10 Gbps or even 1 Gbps across those high bandwidth networks is still unattainable by most users.

The objective is that the effort of the nine participating teams not only will benefit their home institutions, but will serve as a model for other institutions to follow. Read more at: http://sc06.supercomputing.org/pdf/SC06-BWC-CFP.pdf.

SCinet Xnet

While SCinet's capabilities may be at the leading edge compared to many networks, SCinet's Xnet (eXtreme networks) pushes the envelope even farther to provide a venue for showcasing emerging, often pre-commercial or pre-competitive developmental networking technologies, protocols, and experimental networking applications. At SC06 these will include:

* Sensor Networks Virtual Machine. This demonstration by Nortel points to new capabilities in datacenter automation and virtual datacenters separated by thousands of miles. It does so by orchestrating resources as diverse as virtual machines, optical paths, and sensor data reflecting physical events, all within a SOA/Web Services framework.

* Generalized Multiprotocol Label Switching (GMPLS). This NSF-funded DRAGON Project demonstration will combine hybrid network infrastructure from the U.S., Japan and Europe, under GMPLS network control software and DRAGON-developed middleware to establish an entire network topology

that exhibits deterministic, predictable and repeatable performance characteristics.

* Open Fabric Network File System/Remote Direct Memory Access (NFS/RDMA). This demonstration uses RDMA over InfiniBand and iWARP transports to deliver 110 Gbps of network-attached storage bandwidth from a single server. The demonstration utilizes 4xDDR IB and 10 GbE iWARP adapters in conjunction with the Open Fabrics RDMA stack.

* International High Performance Digital Media with Dynamic Optical Multicast. This demonstration emphasizes the potential of an experimental architecture employing Layer 1 optical multicast in conjunction with more traditional Layer 2 multicast services. Multiple sites requiring simultaneous duplex bi-directional, high-definition streaming media can take advantage of the efficiency and low latency of optical multicast services.

* InfiniBand Routing. A new capability for the IB community, IB routing will be demonstrated in two booths at SC06. Using two instances of OpenFabric's subnet manager, OpenSM, adapted for routing, a pair of Longbow XRs provide full-bandwidth, low-latency data exchange between two independently managed InfiniBand subnets. This capability enables physically remote InfiniBand-based HPC installations to communicate securely, rapidly and natively, underpinning the basis of scalable global HPC architectures for scientific and enterprise applications.

SC06 is sponsored by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society and the Association for Computing Machinery's Special Interest Group on Computer Architecture (ACM SIGARCH). For more information, see http://sc06.supercomp.org/.