

# Fluent – Out in Front of New Computing Technology

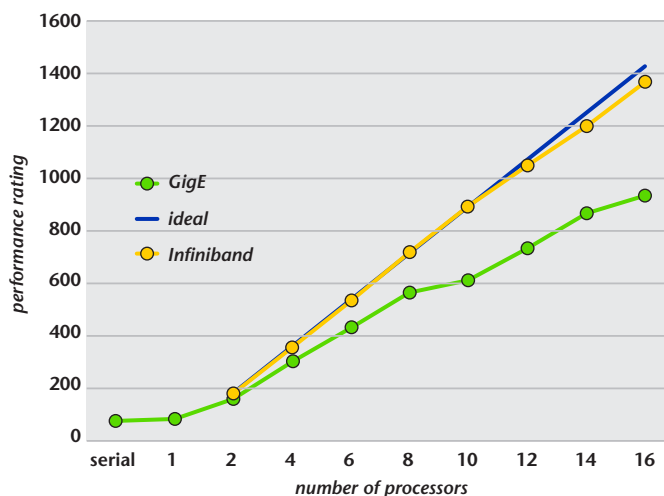
Over the last decade, the ongoing revolution in computing has been a major driving force for the expansion of engineering analysis. Faster and more affordable computer platforms have made detailed CFD studies increasingly feasible within the timeframes required to impact engineering decision making. In 2004, the revolution continues, with new cluster computing technologies providing attractive options to CFD users. Working directly with the leaders in computer hardware innovation, Fluent is well positioned to support these new technologies.

First, the upcoming release of FLUENT 6.2 will provide support for the latest 64-bit processors, including the AMD Opteron and the Intel EM64T (Extended Memory 64 Technology). Preliminary results show both processors performing very well on FLUENT standard benchmarks, with native 64-bit support in FLUENT 6.2 outperforming the 32-bit FLUENT 6.1.22 release by 20-40%. Not surprisingly, clusters built on these new processor technologies are now popular options for Fluent users.

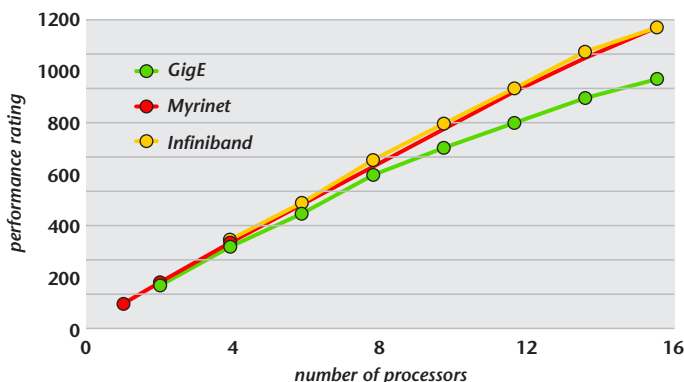
Second, as FLUENT users have increased the cluster size used for their CFD work, the need for higher speed interconnects has emerged as a key issue. Most FLUENT users are aware that parallel processing can reduce the clock time required for computations, by employing multiple CPUs to simultaneously work on individual partitions of the overall computational task. However, as more CPUs are deployed, the time required for communication between CPUs begins to be a bottleneck. Low latency interconnects delay the onset of this bottleneck, allowing efficient use of larger clusters to reduce turnaround time. In FLUENT 6.2 two low-latency interconnects are supported: Myrinet and InfiniBand. Both interconnect options are showing outstanding performance, yielding nearly linear parallel scaling on 16-20 processors for typical applications.

Fluent's partnerships have been a key ingredient for successful rollout and support for these new technologies. Both Intel and AMD have provided technical assistance and early access to their new processor technologies. Support for InfiniBand has been supported by Mellanox Technologies, Voltaire Inc., and Dr. D.K. Panda at Ohio State University, whose MVAPICH software is used as the communication library for InfiniBand in FLUENT 6.2. Mellanox is a leading supplier of InfiniBand technology.

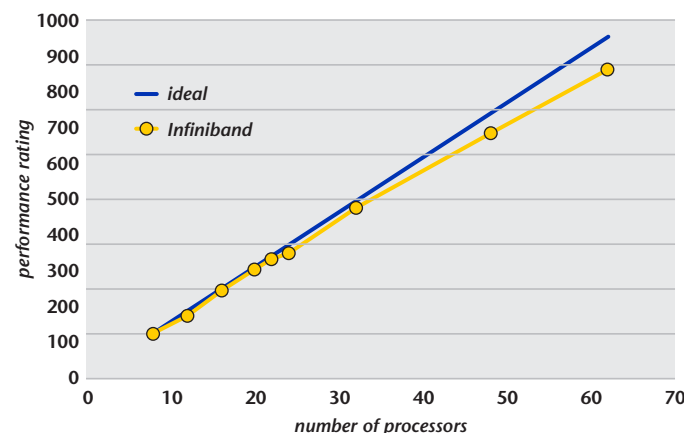
"InfiniBand's superior bandwidth and latency enables parallel applications to distribute larger data sets over more nodes and still achieve higher efficiency," notes Roni Ashuri, VP of Engineering at Mellanox Technologies. "Fluent is leading the industry because their customers can now benefit from the unsurpassed performance and value of InfiniBand." ■



Parallel scaling of FLUENT 6.2 running a 3.6M cell benchmark on a cluster of 2.2GHz Opteron processors; the high-speed InfiniBand interconnect yields greatly improved scaling relative to Gigabit Ethernet



Both Myrinet and InfiniBand continue to scale well as cluster size grows for this 800,000 cell benchmark problem



Parallel FLUENT scalability on an Intel EM64T InfiniBand cluster for the 10M cell FL5L3 transitional duct benchmark case.