Ethernet versus Infiniband

Robert Pan

Earl Haig Secondary School, Toronto, Ontario, Toronto, Ontario

The following report is a point-by-point comparison of Ethernet to Infiniband, followed by an evaluation of parallel computing users. Robert Pan measures the markets currently using parallel computing, the computer systems using ethernet or infiniband, and why markets for parallel computing exist in the first place.

Ethernet vs. Infiniband:

Ethernet and Infiniband are common network connections used in the supercomputing world. Of the Top-500 supercomputer rankings, 226 computers use Infiniband and 188 use Gigabit Ethernet. Infiniband was introduced in 2000 to tie memory and the processes of multiple servers together, so communication speeds would be as fast as if they were on the same PCB. There are four types of Ethernet network cards used in high performance computing, 100Gbps, 40Gbps, 10Gbps and 1Gbps. But there is a 400Gbp network card in the making. The current version of Infiniband is FDR (Fourteen Data Rate), it can transfer 56Gbps or 14Gbps per channel. FDR will be succeeded by EDR (Enhanced Data Rate) next year, which can transfer 100Gbps. The advantage of Infiniband compared to Ethernet is that Infiniband offers flatter topology, less computing power on the CPU, and lower latency. Ethernet however, offers more connectivity across the market for networking equipment.

Parallel Computing:

In business, people argue that Java Enterprise Edition (JEE) will be obsolete in the near future. In parallel computing, there are two major customer problems; one type focuses on short-term goals, and not on the long term. The second type tends to be scared about new things.

There are 3 classifications of customers with respect to parallel computing, the first class being the traditional customers (research, science, and military), the second being customers who never did parallel computing, and finally customers who will not be affected by parallel computing at all. The second class of customers is scared, that is why there are subjective and objective aspects. A subjective aspect of parallel computing is price, and the objective aspect is parallel computing is more difficult than traditional computing. Some time ago, parallel computing customers were only the first and third class of customers. The reason is, customers thought parallel computing was difficult and sequential computing was easy. At that time, in order to introduce some class two customers to the market, people designed specific parallel computing firmware to deal with issues such as security, management, and to reduce complexity and risks.