



Increasing Network Throughput Via Hardware-Based Compression

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Compression plays a key role in networks. For example, software compression programs can typically reduce HTML data by a factor of 3.5, thus saving time and lowering bandwidth requirements. However, they require a lot of compute power, making them an ideal task for offloading to specialized hardware. Such hardware can provide a low-cost alternative to acquiring higher-speed equipment or more network bandwidth.

Data compression is compute intensive. Software implementations burden the host CPU, diverting it from other tasks. A specialized coprocessor can increase throughput by offloading the compression, leaving the main CPU more time to serve connections and handle other general work. In data centers where customers run time-critical business applications, offloading compression will guarantee maximum utilization of network resources and available bandwidth. For data storage systems, higher throughput means faster backups, data archival, and retrievals. For organizations that transfer large amounts of data over Wide Area Networks, hardware compression technology will expedite delivery of data, enable faster application response time (particularly to remote offices), and reduce bandwidth costs. The idea is the same as the common approach of using graphics chips in PCs for tasks such as rendering, which requires enormous processing power.

For example, Indra Networks, StorCompress and WebEnhance are affordable, PCI-X based accelerators that perform gzip/zlib compression entirely in hardware. A recent benchmark showed that Indra's hardware-based compression was 3.3 times faster than software. The test was performed on a Dell Precision Workstation 470 with 4 Intel Pentium 2.793 GHz processors running Windows 2000 server with Hyperthreading enabled. Indra's compression engine caused almost no overhead on the host server CPU. The test was conducted using StorCompress 100, which has a throughput of 40 MB/s. The newly released StorCompress 300 has throughput of 120 MB/s.

WebEnhance is optimized to compress web-based data such as HTML or XML.

StorCompress is optimized to compress data before it is written to a storage device to maximize disk capacity and accelerate backup, restore, and archival speed. Indra's hardware-based compression enables the host server to send, on an average, three times the data for a given bandwidth. For example, suppose you were trying to backup 1 TB of data using a link with 100 MB/s throughput. This would take almost 3 hours without hardware compression and less than 1 hour with it.

Demands on business networks are constantly growing due to more applications, more users, larger tasks, and more data. Satisfying such needs typically involves buying expensive equipment and buying more bandwidth from carriers. One way to save money is to use inexpensive hardware offload devices that can handle common tasks. Data compression is a typical job that can be offloaded onto hardware at relatively low cost. The result is higher transfer rates, faster responses, and greater scalability for a wide range of applications, including even the most demanding and mission-critical ones.

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