Supporting Both NetEx® and TCP Communications Stacks

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TCP and NetEx are two different communication protocols and often are used together by Global 1000 and Fortune 500 companies to solve different needs based upon the strengths of each protocol. NetEx, for example, is far more efficient than TCP for moving large amounts of business-critical data over long distances with the highest degree of performance and reliability. TCP, which often comes pre-packaged with operating systems, may be perfectly suitable for moving smaller amounts of data over shorter distances, such as campus or local area networks.

Here are some of the differences between TCP and NexEx that may affect your decision to support multiple communication protocols.

Performance

Over the years, computer vendors have improved TCP performance for throughput and efficiency. IBM, for example, has made significant performance improvements to its version of TCP products as compared to earlier versions. As a result, when moving data between similar IBM systems using the latest release levels and hardware platforms, TCP performance is good.

Unfortunately, not every implementation of TCP has been enhanced to the same extent. With a mix of different computer platforms in most organizations, TCP performance is only as fast as the slowest TCP implementation. With different RFCs applied to the TCP implementations, it is no wonder that performance differs between platforms. One version of TCP may have RFC extensions applied to the implementation and others may not, which negates the advantages. TCP will default to the lowest common feature set between end points. With an average of four to six different types of computer systems in most networks, it also makes it very difficult to solve performance issues, from a multi-vendor standpoint.

The NetEx protocol, from the very beginning, was designed for performance and reliability. It has also been a priority to keep a consistent feature set across all NetEx implementations regardless of the platform. NetEx provides heterogeneous connectivity among the most common types of server platforms. Because the NetEx transport comes from one company, multiple vendor support issues do not exist.

In recent tests, NetEx/IP throughput outperformed TCP/IP (with performance extensions) between 10–44 times in extended distance configurations. The longer the distance, the greater the advantage NetEx/IP demonstrated over TCP/IP.

NetEx uses larger window sizes, which keeps the communications pipe full, negating distance-related latency issues. These tests were conducted with TCP window sizes of 64K and 256K.

To improve performance, some TCP vendors have implemented spoofing algorithms, which risk data delivery and integrity. Spoofing techniques second-guess (pre-acknowledge) data delivery prior to reaching the end destination. In the event of network disruption, it is possible that data buffers may be cleared, making it impossible to deliver the data without restarting the job. Anytime data is pre-acknowledged to the application, delivery and integrity are at risk. NetEx, on the other hand, does not spoof data delivery and holds onto buffered data until positive delivery is acknowledged.

Protocol Strengths

The main difference between the protocols is that TCP is a byte streaming protocol and NetEx is a block-streaming protocol.

Byte-streaming protocols move data in smaller packets, requiring more return acknowledgments and typically use smaller window sizes.

Block streaming protocols are capable of "blocking" data together prior to sending over the network. This creates significant efficiencies because more data is moved in each transmission block, resulting in fewer acknowledgments required. NetEx window sizes are virtually unlimited, which allows more data to traverse the wide area network segment.

The TCP protocol uses a slow-start algorithm, which means less data is moved during the initial startup of a file transfer. Performance may ramp to higher levels when directed by the receiving TCP. This is a means of avoiding congestion with other TCP traffic. NetEx uses a fast-start algorithm that assumes bandwidth is available for data transmission. If the bandwidth is available, more data is moved over the network sooner, translating to better link utilization. If the bandwidth is unavailable, NetEx can be throttled by using rate controls, making the protocol Internet friendly and leaving bandwidth available for other traffic. In the future, NetEx will have dynamic throttling mechanisms in place to use available bandwidth even more efficiently.

Many customers elect to operate with both NetEx and TCP stacks on their server platforms to solve different problems. In many cases, FTP/TCP applications are

used for ad hoc, non-mission-critical file transfer requirements. These are typically small amounts of data that must be moved over shorter distances.

Alternatively, NetEx is used in the mission-critical data process, normally with larger amounts of data, where performance and reliability are required. NetEx is also very efficient over longer network distances because of the efficiency of error recovery. NetEx only retransmits data received in error, avoiding the inefficiency of TCP's method of serially retransmitting all data from the point of error.

Software Packaging

For many platforms, TCP comes pre-packaged with the operating system. On other platforms, TCP may be a separately packaged and/or separately priced product offering. NetEx is purchased separately from Network Executive Software and is very simple to install and use. NetEx coexists with TCP and, once installed, requires very little maintenance for ongoing support.