SANDVINE

TCP Optimization
Get More From Your TCP Network

TCP OPTIMIZATION BENEFITS

Get more from existing network resources
Minimize the excessive overhead introduced by TCP and see a marked improvement in network utilization rates

Deliver higher performing services
Control TCP connections to minimize retransmissions, maximize throughput, and provide more goodput and better service performance

Offer a better quality of experience
Delivers more consistent traffic flows for more reliable, higher quality streaming and interactive services

SOLUTION OVERVIEW
The Transmission Control Protocol (TCP) is the engine of the Internet and its dominant role in traffic delivery has only grown as customers demand support for an ever-increasing array of personal, social, and business applications and services. However, TCP is not without its faults, and its well-known weaknesses have created a significant drag on network performance and customer quality of experience. Many operators that have overlooked TCP's shortcomings in the past are now considering new ways to manage TCP traffic to increase its performance, service quality, and network utilization.

Use Case Technology Overview
The very characteristics of TCP that made it very popular and successful lead to its performance challenges in modern day networks. TCP is largely focused on providing failsafe traffic delivery, but this reliability comes at a cost: lower performance, subpar customer experience, and underutilized network assets.

TCP is hobbled by its lack of end-to-end network visibility. Without the ability to see and adequately adapt to changing conditions, TCP slows down or accelerates traffic based on antiquated congestion management assumptions. TCP's limitations negatively impact network performance by being too slow to utilize available bandwidth, too fast to overload network buffers resulting in dropped packets and retransmits, and too focused on each specific traffic flow to more effectively manage the entirety of all traffic traversing a network link.

Sandvine's TCP Optimization Solution is designed to minimize the inefficiencies introduced by TCP so that all network types deliver a higher rate of goodput, over faster, more consistent and predictable traffic flows. These improvements are achieved by lowering retransmission rates, by reducing the time to reach maximum throughput, by sustaining that throughput, and by better adapting to the packet loss and the congestion that occurs in network "last-miles".

Figure 1

RAN Spectrum Optimization improved TCP transfer speeds by as much as 43% in this European 3G/4G network
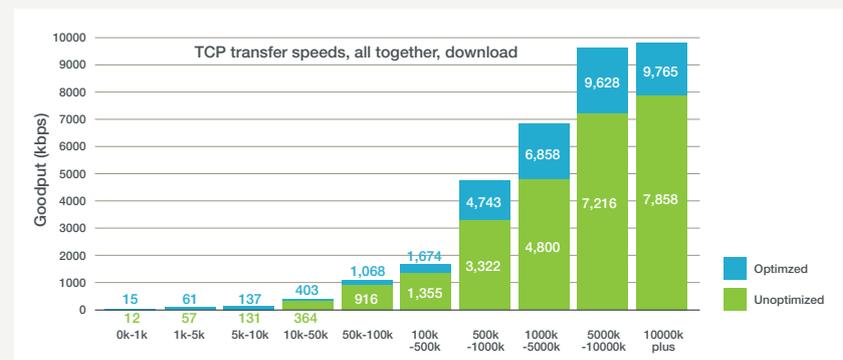
SANDVINE'S UNIQUE BENEFITS FOR TCP OPTIMIZATION

Maximize Performance

Goodput, defined as the payload without retransmissions, can be monitored by measuring the unique application data volume per TCP connection. By reducing the number of retransmits, the solution increases the ratio of goodput to throughput, delivering consistent and significant improvements in the amount of payload provided and the performance of the network services delivered.

Better Utilize Network Capacity

TCP is slow to ramp-up to maximum, available transmission rates. This occurs with each new TCP flow and, taken in aggregate, this TCP feature (aptly named "SlowStart") wastes available capacity, driving down network resource utilization rates. These rates decline even more when traffic travels over a long distance or in networks with more available bandwidth. The TCP Optimization Solution reduces the time to reach available bandwidth by minimizing the latency between the subscriber/access network and the Internet/transit network and by then applying techniques to optimize the performance of each 'side' of the connection.

Improved Service Quality

Sandvine improves service quality by accelerating TCP data transmissions and increasing application performance. The solution also minimizes the lag introduced into streaming and interactive applications when excessively buffered in last-mile networks.

Rapid Payback on the Investment

The solution provides a clear and valuable, near-term payback as it can create immediate savings by extending the life of existing mobile network resources and by lowering rates paid for interconnect fees.

CONCLUSION

The TCP Optimization Solution markedly improves upon the performance and the quality of TCP based, network applications and services by accelerating throughput, using more of the capacity at hand, lowering retransmission rates and increasing goodput, and limiting the latency that can be introduced in the network last-mile.

In addition, the Solution presents a compelling business case for increasing the performance and utilization of existing network resources rather than spending significantly more on new network buildout.

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ABOUT SANDVINE

Sandvine helps organizations run world-class networks with Active Network Intelligence, leveraging machine learning analytics and closed-loop automation to identify and adapt to network behavior in real-time. With Sandvine, organizations have the power of a highly automated platform from a single vendor that delivers a deep understanding of their network data to drive faster, better decisions. For more information, visit **sandvine.com** or follow Sandvine on Twitter at **@Sandvine.**

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