SANDVINE

RAN Spectrum Optimization

Accelerate Your Mobile Traffic and Deliver a Better Experience

RAN SPECTRUM OPTIMIZATION BENEFITS

Get more from existing mobile 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 interfactive services

SOLUTION OVERVIEW

Hands down, the radio access network is the costliest link in an operator's network. Operators have already spent huge sums on spectrum and mobile infrastructure, and subscribers show no sign of slowing down their demand for more mobile bandwidth. Adding capacity may be a necessity, but operators need to also consider how to get more from their existing RANs or risk bulging CAPEX and an inefficient use of the network resources at hand.

Use Case Technology Overview

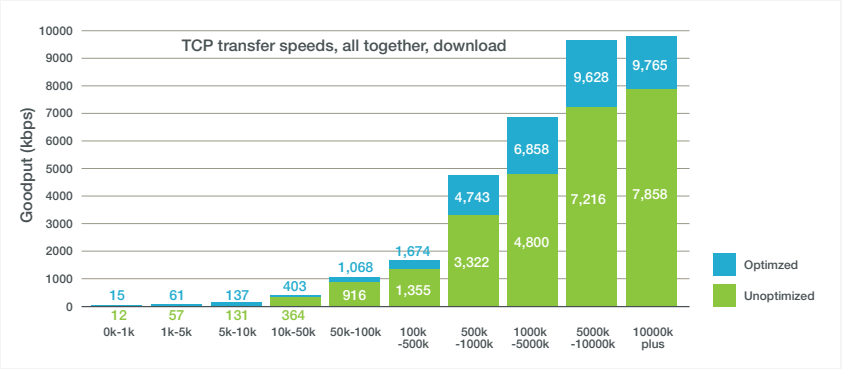
TCP was originally designed to reliably deliver packets over fix access networks, where line disturbances like lost packets can more reliably indicate congestion and the need to reduce transfer rates. Today TCP transports well over 90% of today's mobile Internet traffic even though it can be highly inefficient in its response to the less predictable nature of the mobile network – with its high error rates, intermittent connectivity, and abrupt variations in speed.

In mobile networks, TCP tends to be too slow to accelerate when matching to available bandwidth and too quick to reduce throughput even when packet loss is unrelated to congestion. TCP is also too aggressive in filling buffers and queues when network capacity is unavailable, introducing latency that ruins real time and interactive application services.

RAN Spectrum Optimization is designed to minimize the inefficiencies introduced by TCP so that mobile networks 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 the mobile last-mile.

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 RAN SPECTRUM 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 mobile services delivered.

Better Utilize Mobile 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 mobile resource utilization rates. These rates go down even more when traffic travels over a long distance or in networks with more available bandwidth. The RAN 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 interconnect loads and associated fees.

CONCLUSION

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

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