TCP Optimization for Wireless Networks

Improving data delivery at the wireless radio area network (RAN) end of the communication path—where there is less available wireless bandwidth, network performance issues are more likely, and latencies are typically higher than on the wireline Internet—can help communications service providers (CSPs) boost network efficiency and deliver higher quality of experience (QoE) to subscribers. F5® TCP Express™, a feature of the BIG-IP® platform, uses state-of-the-art TCP optimization algorithms and techniques to dramatically improve performance across real-world subscriber access networks, and to deliver significantly higher QoE.

Provide Reliable and Consistent Data Delivery

CSPs have deployed more advanced high-speed mobile networks to deliver more content and provide better performance to subscribers. However, as one of your most constrained resources and a significant point of network bottleneck, optimizing the RAN is likely one of your greatest challenges. Broken connections and slow data transfer rates can disappoint customers and result in subscriber churn and lost revenue. It's no longer enough to have available network coverage—delivering content with consistently high performance and lightning speed is expected.

The most effective way to manage data delivery is to optimize the TCP connection with a solution that sits between the Internet and the wireless network that can manage both sides of the connection—as each side can have vastly different performance characteristics. For example, the Internet (or Gi) side of the mobile network typically exhibits low latency, low packet loss, high bandwidth, and minimal congestion; it requires different connection settings than the RAN, which tends to have higher latency, packet loss, and congestion. The TCP protocol was not designed to handle these connections well, and for this reason there have been many standards-based recommendations for improving congestion control and TCP performance.

To provide optimal RAN delivery performance, CSPs need to implement a TCP optimization solution that can negotiate the different profiles for each side of the connection. F5 TCP Express, a customized TCP stack provided by the BIG-IP platform relies on advanced TCP optimization algorithms and techniques through the use of published optimization techniques and patented proprietary solutions to deliver content. TCP Express sits inline between the Internet and RAN and terminates the TCP connection. Because it can negotiate and manage the different connection profiles for each side of the connection, TCP Express offers a significant performance boost for data transfer rates and a 200 percent bandwidth utilization improvement.

Key features

- **Highly Optimized TCP Stack**—Uses advanced algorithms and is based on more than a dozen TCP optimization RFCs to optimize network performance
- **Dynamic and Automatic Flow Optimization**—Dynamically and automatically optimizes TCP window sizes and TCP performance information for each connected device (each client and each server)
- **Customizable Controls**—Provides the ability to manually adjust parameters with preset profiles
- **Full Proxy Architecture**—Offers complete flow control with no effect on performance

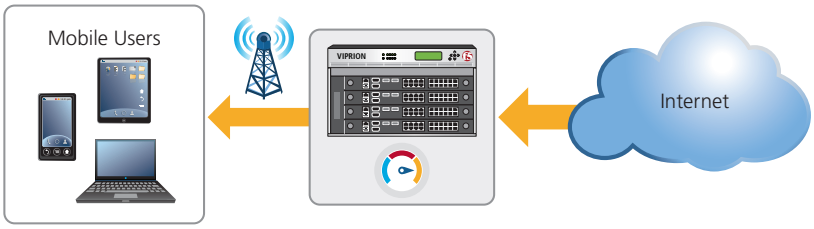
Key benefits

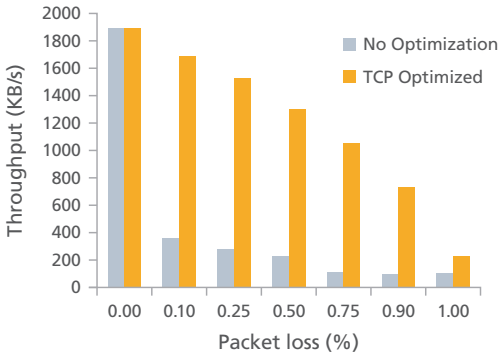
- **Provide Better Customer Experience**—Improved reliability and network performance results in higher subscriber satisfaction and revenue
- **Improve Transmission Performance**—Advanced algorithms and bandwidth optimization techniques help maximize the bandwidth capacity of the network
- **Increase Network Reliability**—Real-time monitoring of the network connection and use of customized algorithms improves connection stability and performance
- **Optimize Bandwidth Efficiency**—Automatic adjustment of TCP parameters such as TCP window size maximizes the performance of the data path

Solution

TCP Express, a native TCP/IP stack and part of the BIG-IP platform, provides the following:

- **Enhanced TCP stack**—Advanced TCP algorithms based on RFC standards and proprietary optimizations deliver a more reliable data delivery system. The elimination of traffic inefficiencies along with improved congestion algorithms creates a better customer QoE. All TCP Express features have been tested in laboratory and real-world situations.
- **Dynamic and automatic flow optimization**—The BIG-IP platform applies the advanced TCP connection enhancements to each individual connection. This means that every connection is tuned to provide the maximum benefit.
- **Customizable controls**—All of the TCP Express algorithms provide access to configuration parameters that can be tuned to meet the specific connection characteristics. All values used in the TCP Express solution are exposed and can be manipulated through the BIG-IP system management interface.
- **Full-proxy architecture**—The full-proxy architecture allows TCP Express to manage the TCP connection and apply the full benefits of an optimized TCP solution, resulting in a connection that is less affected by congestion and latency, and offers better QoE.





TCP Express provides an optimized TCP solution to deliver maximum network performance under all conditions.

Learn more

For more information about F5 TCP Express, please see the following resources or use the search function on f5.com.

Product page

BIG-IP Product Suite

White paper

Intelligent Traffic Management with the F5 BIG-IP Platform

Solution profile

Optimize and Monetize Networks with BIG-IP Policy Enforcement Manager

F5 Networks, Inc. 401 Elliott Avenue West, Seattle, WA 98119 888-882-4447 www.f5.com

F5 Networks, Inc.
Corporate Headquarters
info@f5.com

F5 Networks
Asia-Pacific
apacinfo@f5.com

F5 Networks Ltd.
Europe/Middle-East/Africa
emeainfo@f5.com

F5 Networks
Japan K.K.
f5j-info@f5.com