

SESSION OPTIMIZATION

Introduction

The 128 Technology Network Platform incorporates session optimization which enables high performance across a wide range of challenging connectivity,

For many locations providing high bandwidth connectivity with minimal loss and latency is not possible. Instead the network provider may need to rely on satellite, line-of-sight RF, wireless, or other connectivity which may exhibit high packet loss and/or significant round-trip times. In these cases, the throughput of traffic using the TCP protocol can be severely reduced, as illustrated in the graph below for high packet loss.

128 Technology has seamlessly integrated session optimization into the 128T Session Smart Router providing high performance with unique benefits relative to WAN optimization solutions.

WAN optimization limitations

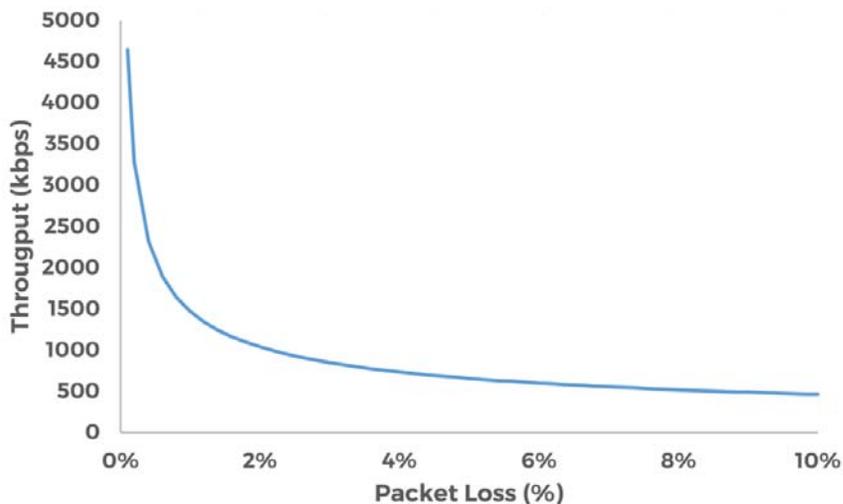
Many vendors offer WAN optimization appliances specifically to improve performance over poor connectivity links. However, these solutions have numerous limitations:

- **Multi-platform complexity:** The typical WAN optimization solution requires another hardware or software platform at each site.
- **Limited control:** When optimization is separated from routing and other functions, fairness algorithms or prioritization policies can be modified by the next network function, which may even be in the same rack or server.
- **Indirect awareness:** Typically optimization solutions rely on in-band information to indirectly determine path and queuing characteristics, providing a very limited and often over-sensitive view of the path.
- **Protocol limitations:** Since optimization solutions have limited scope and must interoperate, they can be constrained by standards-based protocols.

Because of these limitations existing optimization approaches may not be ideal for many network deployments.

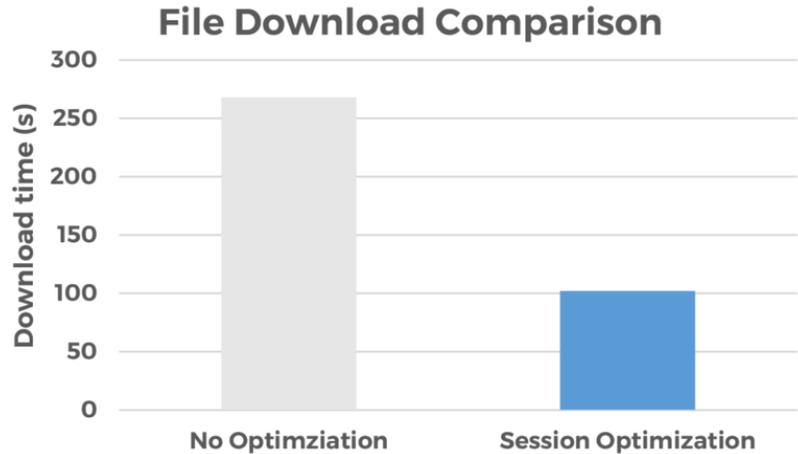
Key Benefits

- Optimized throughput
- Simplified management
- Full control
- Direct visibility
- Metadata enhanced



Session Optimization

To accommodate satellite, line-of-sight RF, LTE, and any other type of challenging connectivity, the 128T Session Smart Router incorporates session optimization to maximize the performance across any path. Session optimization employs several techniques to enhance performance including fast local acknowledgement, rapid starting, maximum bandwidth estimation, and reduced loss sensitivity. 128T optimization can improve the performance dramatically especially for challenging paths. For example, the figure above shows measurements collected at a customer site in North America using a satellite connection from a major service provider. A test script measured the time to download a large file across a satellite link experiencing only moderate packet loss and latency with and without session optimization activated. When 'No Optimization' is present the file transfer takes greater than 2.5x longer compared to when 'Session Optimization' is active. The Session Smart router is achieving optimal throughput.



Compared to other WAN optimization solutions the 128T Session Smart Router has a number of unique advantages:

- **Simplified management:** Relative to multiple discrete hardware or software solutions, the 128T solution combines routing, WAN optimization, and potentially other functions into a single platform, simplifying management.
- **Full control:** Compared to separate platforms with discrete queues and inconsistent policies, the 128T solution employs a single, consistent set of policies and queues for all functions. This provides full control to the administrator, congestion awareness to session optimization and insures fairness and prioritization across all sessions, TCP or otherwise.
- **Direct visibility:** Instead of only indirectly detecting path quality through the TCP protocol on the current path, the 128T solution actively and continuously monitors all paths, which can provide direct visibility for the system and session optimization.
- **Metadata enhanced:** The 128T architecture employs a unique metadata approach to achieve session-state awareness across all routers. This metadata provides an out-of-band method to signal across all paths between routers, which can enhance session optimization.

The 128T Router dramatically improves performance with unique advantages relative to competing solutions.

Summary

For an enterprise, a 128T Router with session optimization produces quantifiable benefits. The optimized throughput enables a business to either transfer more enterprise-critical data across a challenging path or reduce connectivity expenditures. Relative to other WAN optimization solutions, the 128T architecture offers unique advantages of simplifying management, providing greater control, improving visibility, and enhancing performance.