TrueSpeed™

Automated TCP Test for the T-BERD®/MTS-6000A and 8000 Platforms with MSAM

Ordering Information: CTLAYER4 – 10M to 1GigE TCP Wirespeed
                            CT10GLAYER4 – 10G TCP Wirespeed

Use Case: Automate the verification of TCP throughput in carrier Ethernet and IP field networks per industry best practices

Intended Audience

• Field groups (including backhaul technicians), special services and central office technicians responsible for Ethernet/IP services installation and troubleshooting.

• Professional services and managed service engineers responsible for the maintenance, troubleshooting and evolution of end-customer SLAs.

• Enterprise and government network professionals responsible for circuit and network installation and fault analysis.

Benefits

Traditionally, the provider installs Ethernet services using RFC2544 or other types of layer 2/3 tests, but the customer's business applications run on the TCP layer. This "gap" in testing is the cause of customer complaints/churn and significantly increases OpEx for service providers, due to additional truck rolls per service activation.

JDSU innovatively solves this problem by introducing the industry's first automated TCP layer throughput test, *TrueSpeed™*, which integrates best practices of industry experts.

With this automated TCP test, a service provider can run traditional RFC2544 installation tests and a quick TCP test during the same truck roll and with the same skill level technician. Customer case studies have shown that the *TrueSpeed™* test methodology prevents future truck rolls and saves at least 20% of overall installation OpEx.

The test can be run in as little as 3 minutes by novice technicians due to its simple "push button" execution and provides automated reporting which can be used by more experienced network engineers for verification and SLA implementation.

TrueSpeed™ Benefit/Feature Summary

| Benefit	Feature	Description	Advantage
Ensure end customer satisfaction before service is activated and prevent customer churn.	10M → 10G TCP testing	Emulate up to 64 users / sessions and fill the pipe with real TCP traffic up to 10GigE.	Emulating multiple users / sessions ensures that realistic end-customer TCP window sizes can be tested on "long fat networks" (high bandwidth, high latency links)
Save significant turn-up or troubleshooting time with an automated test, and without the need for an expert engineer.	One button, automated, standards-based TCP testing	In as little as 3 minutes, an automated and comprehensive TCP test is conducted providing dashboard results for the beginner and advanced reports for the Tier 2/3 engineer	Traditional RFC2544 installation tests and TCP tests can be conducted during the same truck roll and with the same skill level technician.
Avoid future troubleshooting truck rolls and solve the bandwidth discrepancy mystery by applying industry standard best practices.	Repeatable TCP tests and consistent results	The automated test method has been defined by industry experts and provides a best practice approach to testing path MTU, round trip latency, and TCP throughput with special emphasis on rapid diagnosis of network issues that can impact TCP performance	Both network providers and end-users can conduct repeatable tests and compare "apples to apples" results and significantly reduce finger-pointing
Network providers can expertly verify and recommend the benefits of traffic shaping to end customers, confidently proving proper network operation.	Advanced traffic shaping tests	Exposes potential traffic policing versus shaping problems, which is a key component of optimized TCP performance over WAN / Metro networks.	A complex network engineering condition is simplified in a one step push button test with the new TCP automation test.
Prove to the customers (who use iperf) that the CPE may be the problem	Compatible with popular "iperf" TCP tool	Test T-BERD/MTS-6000A against standard server running "iperf"	Sectionalize TCP performance issues

Use Case: Verify TCP Layer Throughput within Network Provider Network

In this use case, the T-BERD/MTS-6000A can be used as TCP client and server, to verify proper TCP throughput within the network provider's network. It is recommended to run the automated TCP throughput test after the traditional layer 2/3 RFC2544 test.

T-BERD/MTS-6000A
TCP client

T-BERD/MTS-6000A
TCP server
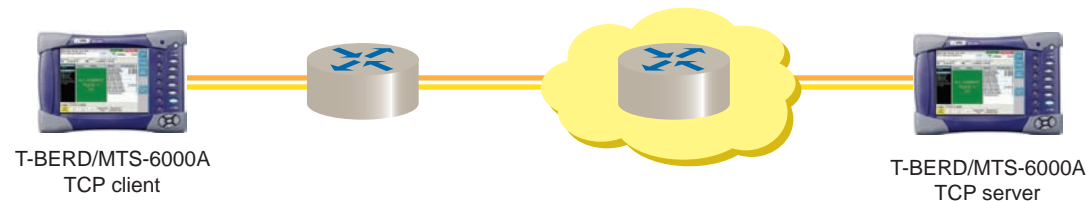
Use Case: Verify TCP Layer Throughput "End-to-End" (from CPE to CPE)

After the network provider's network is verified, the T-BERD/MTS-6000A also be used to verify TCP layer throughput in an end-to-end manner. Often times, this test provides the final evidence that the TCP performance issue resides in the configuration of equipment (servers, firewalls, etc.) on the customer premise.

Customer premise office

Data center

Provider network

T-BERD/MTS-6000A
TCP client

T-BERD/MTS-6000A
TCP server
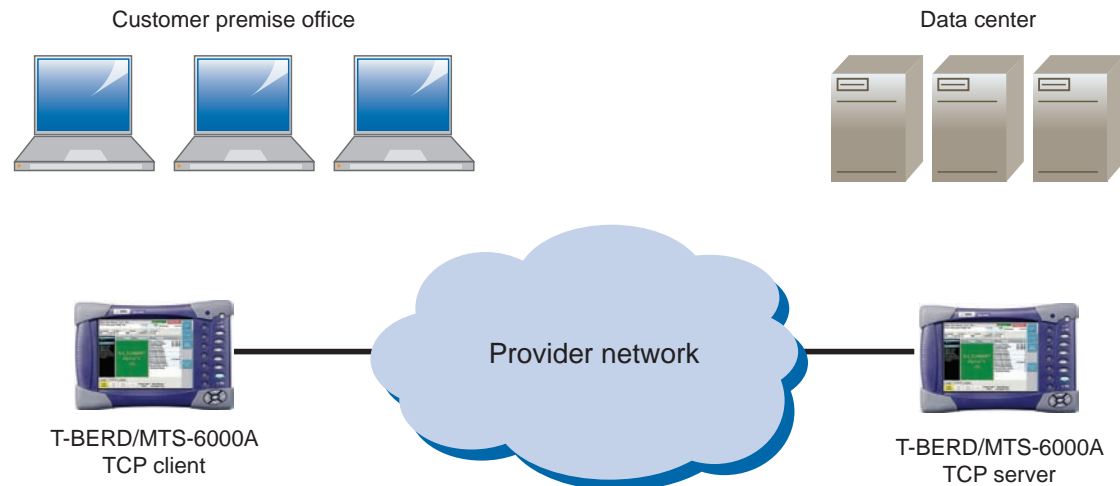
Dashboard Results for the Beginner

While simplifying the test configuration is the first step to automating TCP testing, simple results interpretation and guided problem diagnosis is essential for proper service verification. The TCP Automation script provides an easy to understand TCP dashboard results screen and provides two (2) metrics to diagnose loss versus delay related TCP performance degradation. By clicking on the "I" information buttons, detailed help information is instantly revealed.
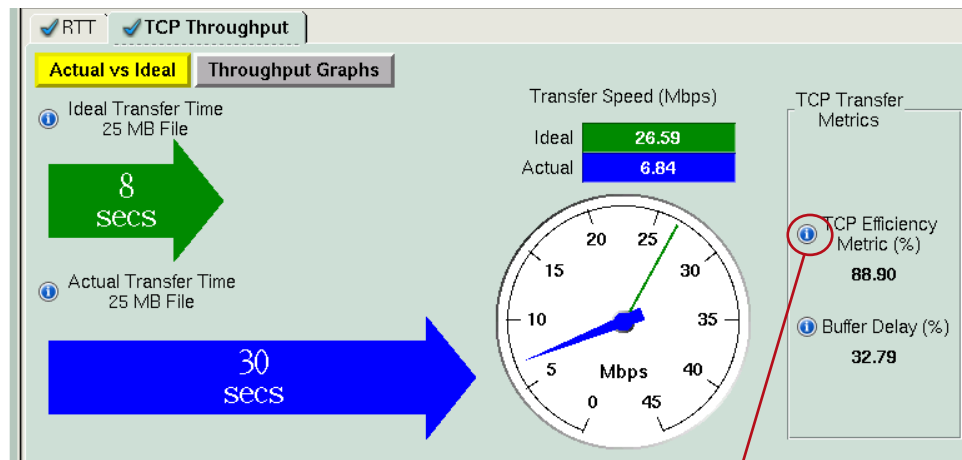

This metric is calculated as:

   (Total Bytes - Retransmitted Bytes) × 100 / Total Bytes

Values below 99% indicate packet loss may be significant affecting TCP performance; review throughput graphs for detailed analysis of TCP retransmissions.

Advanced Graphical Results and Reports for the Expert

Even though the *TrueSpeed™* test is intended to be performed by less experienced field technicians, deep analysis (normally provided by lab test equipment) is also provided by the T-BERD/MTS-6000A MSAM test set. These graphs and corresponding reports can be used by the Tier 2/3 network engineer to diagnose complex performance issues across the entire duration of the TCP test.
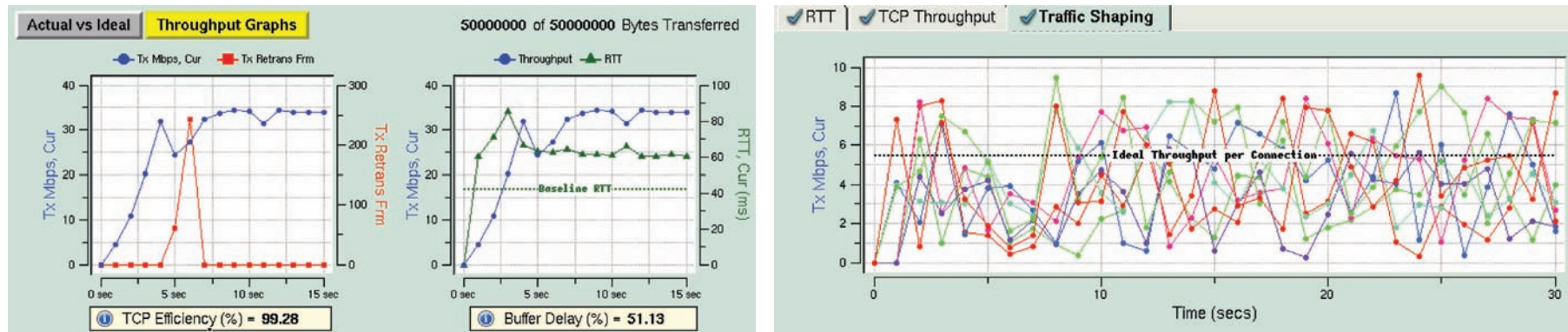
Intuitive UI with the Ability to Load Standard Test Configurations

Maintaining the same user interface as the JDSU Expert RFC2544 automated test, the TCP automation test provides customizable test configurations which are key to the "push button" operation of the TCP throughput test. The Tier 3 engineer can develop the standard test configurations and these can be loaded by the field technician to populate all test parameters including IP addresses, TCP window size, TCP MSS, test duration, etc.
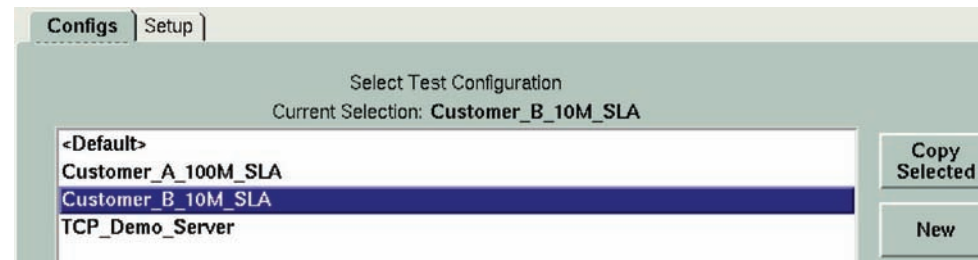
FAQ

Q: Does a TrueSpeed™ layer test take more time than an RFC2544 test?

A: TCP can take more time without *TrueSpeed™*. TCP layer related issues are actually quite common, but can be very complex to isolate. With industry best practices and consistent metrics in a push button test, it can take less time than an RFC2544 test.

Q: Will conducting a TCP layer test add significant time?

A: No, the *TrueSpeed™* test can be completed in less than 5 minutes. The *TrueSpeed™* test adds very little additional cost to a field installation. JDSU recommends first conducting an RFC2544 test to verify the network at layer 2/3 and then completing the *TrueSpeed™* test.

Q: Service providers do not manage customer applications. Why is TCP layer testing compelling for network operators?

A: Traditional layer 2/3 RFC-based testing does not completely verify the ability of the network to carry application traffic. Specifically, network devices (routers, switches, etc.) employ traffic policing techniques that drop packets in a way that at layer 2/3 may be acceptable, but can cause serious performance degradation at layer 4 (TCP). Network operators can reduce bandwidth discrepancies by providing TCP layer results to their customers and prove that the network is not the cause of poor application performance.

Q: What is iperf?

A: iperf is a commonly used network testing tool that creates TCP sessions to measure the throughput of a network. The iperf tool runs on Windows and Linux computers and is commonly used by customers and advanced network engineers to verify TCP throughput performance. The key limitation is that iperf is software-based and cannot be used to test higher speed networks (100 to 200 Mbps upper limit is a good rule of thumb).

Q: Is this a software or hardware upgrade to existing units in the field and which platforms are supported?

A: The TCP Wirespeed option is a software upgrade for the T-BERD/MTS-6000A and 8000 MSAM. *TrueSpeed™* is included with this option.