



Link™ Capture Software



TRex

## SOLUTION DESCRIPTION

# Scaling TRex Traffic Generation Performance

Link™ Capture Software for Napatech SmartNICs

Testing and validating network performance is of the utmost importance to network equipment manufacturers, operators and owners. In the past, the traditional approach to testing network performance was based on proprietary traffic generators. But while such solutions have indeed proved efficient for a long series of use cases, they either fall short or prove massively cost prohibitive when it comes to complex and realistic traffic generation.

To manage the cumulating density of functionalities and workloads, the industry now demands a testing regime that not only delivers outstanding performance – but also offers better scalability and drastic cost improvements.

### TRex

TRex is an open source traffic generator developed specifically to address these shortcomings through an innovative and extendable software implementation. What differentiates TRex is its portability, cost, capacity and flexibility.

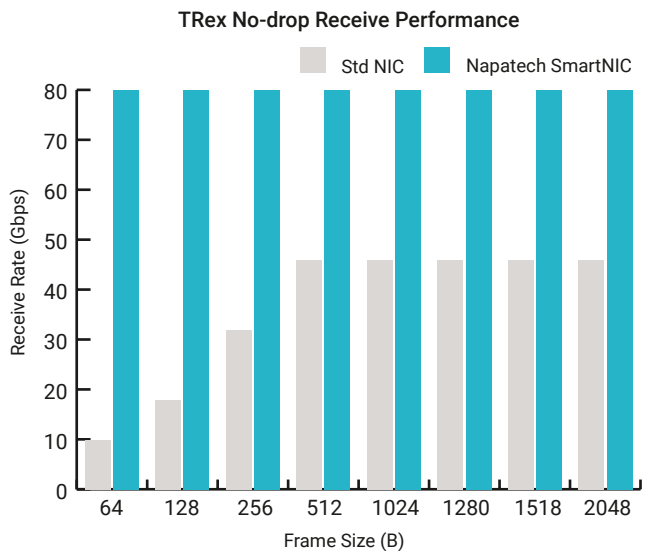
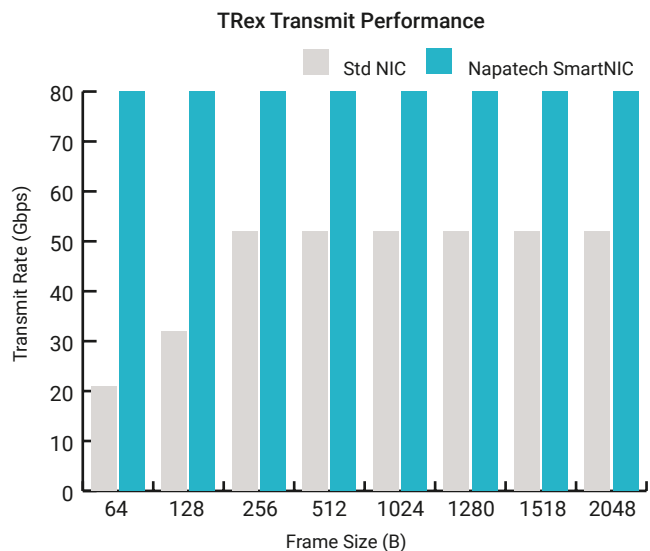
As for any other traffic generation solution, the ability for TRex to reliably generate packets at line rate across all packet sizes is paramount. Whether simply packet blasting or replaying PCAP files for testing, the ability to send traffic for small packets at the maximum speed is a prerequisite.

Traffic reception is also of critical importance. The ability to receive the generated traffic once it has traversed the Device Under Test (DUT) is the only way of measuring the effectiveness of the solution. If the traffic reception does not match the generation capabilities, testing is compromised as one cannot identify if it is the DUT that is dropping traffic or the test equipment itself.

### Accelerated TRex Performance

In addressing this challenge, Napatech has created a hardware acceleration solution, based on the Napatech Link™ Capture Software, that alleviates the load on the CPU and thereby greatly increases TRex performance.

Optimized for lossless transmit and receive, the solution demonstrates substantial performance advantages for TRex



compared to a standard Network Interface Card (NIC):

- Up to 4x transmit performance improvement
- Up to 16x receive performance improvement

## Turning Acceleration into Value

These performance advantages ultimately allow you to:

- Maximize your server performance by improving CPU utilization
- Minimize your TCO by reducing number of servers, thus optimizing rack space, power, cooling and operational expenses
- Diminish your time-to-resolution, thereby enabling greatly increased efficiency

TREx generates layer 4-7 traffic based on pre-processing and smart replay of real traffic templates. TREx amplifies both client and server-side traffic. When running on the Napatech SmartNIC with Link™ Capture Software, TREx can both generate and receive traffic at 2x40G line rate regardless of packet size. This enables scalability both of bandwidth and feature complexities, thus providing businesses a high-performance and massively cost-efficient alternative to proprietary traffic generators. TREx Stateless functionality includes support for multiple streams, the ability to change any packet field and provides per stream statistics, latency and jitter. Advanced



### Napatech Link™ Capture Software

The stunning benchmarks for TREx were achieved by deploying Napatech's Reconfigurable Computing Platform™, based on FPGA-based Link™ Capture Software and Napatech SmartNIC hardware.

Napatech's Reconfigurable Computing Platform flexibly offloads, accelerates and secures open, standard, high-volume and low-cost server platforms allowing them to meet the performance requirements for networking, communications and cybersecurity applications.

stateful functionality includes support for emulating L7 traffic with fully-featured scalable TCP layer.

### Test Configuration

The outstanding improvements achieved with this solution were demonstrated by comparing TREx performance running on a Dell PowerEdge R740 with a standard 40G NIC card and the Napatech NT200 SmartNIC.

### Key Solution Features

- Line rate network throughput for all packet sizes
- Lossless capture for perfect inspection and detection
- Onboard packet buffering during micro-burst or PCI Express bus congestion scenarios
- Advanced host memory buffer management for ultra-high CPU cache performance
- Packet classification, match/action filtering and zero-copy forwarding
- Intelligent and flexible load distribution to as many as 64 queues improving CPU cache performance by always delivering the same flows to the same cores



### TREx

TREx is an ideal example of the type of critical enterprise security application that can achieve better performance through hardware acceleration. TREx is an open source, low cost, stateful and stateless traffic generator. Typical use cases include:

- Creating high scale benchmarks for stateful networking gear, e.g. firewalls, DPI, IPS and load balancers
- Simulating high scale DDOS attacks
- Performing high scale, flexible testing for switches
- Performing scale tests for huge numbers of clients/servers for controller-based testing
- Performing EDVT and production tests

TREx can be compiled with native support for hardware acceleration based on Napatech hardware and software. Napatech linux driver, installation instructions and source are available at: [github.com/cisco-system-traffic-generator/trex-core](https://github.com/cisco-system-traffic-generator/trex-core)

Napatech helps companies to reimagine their business by bringing hyperscale computing benefits to IT organizations of every size. We enhance open and standard virtualized servers to boost innovation and release valuable computing resources that improve services and increase revenue. Our Reconfigurable Computing Platform™ is based on a broad set of FPGA software for leading IT compute, network and security applications that are supported on a wide array of FPGA hardware designs.

**NAPATECH RECONFIGURABLE COMPUTING**

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