Mango StorageBoost™ NVMe over TCP Target

Driving Force for Datacenter Acceleration

EXECUTIVE SUMMARY

Mango StorageBoost™ – NVMe over TCP Target (NTT) is a revolutionary solution that enables high-performance disaggregated storage systems. Built on the standard TCP/IP protocol, NTT allows data centers to establish Ethernet-based infrastructures, significantly reducing total cost of ownership (TCO) while providing exceptional performance and scalability.

High Performance

NTT delivers unmatched performance by offloading the entire I/O processing to dedicated hardware, reaching 90+% line-rate network speed. Powered by the TCP/IP Offload Engine (TOE), NTT accelerates the NVMe/TCP data path with zero CPU usage.

High Flexibility

NTT delivers exceptional flexibility, offering a comprehensive range of customizable network and storage features. Administrators can easily configure storage servers tailored to the specific needs of their environment, ensuring optimal performance and efficiency.

High Interoperability

NTT complies with established industry standards, ensuring effortless integration into existing datacenters. Additionally, its Ethernet-based solution paves the way for a highly cost-effective, vendor-agnostic infrastructure.

HIGHLIGHTS

HIGH PERFORMANCE NVME-OF TARGET SOLUTION

- Line-rate performance saturating the capacity of the network interface
- Zero CPU usage in the NVMe/TCP data path
- Direct communication with NVMe SSDs without CPU intervention

CONFIGURABLE AND ADAPTABLE STORAGE SYSTEM

- Customizable NVMe & NVMe-oF capabilities (# of subsystems, # of connections, etc.)
- Configurable visibility of NVMe SSDs for exclusive or shared data accesses
- Flexible solution incorporating various storage features (reliability, security, etc.)

INTEROPERABLE AND COMPATIBLE STORAGE SOLUTION

- Compatible with standard TCP/IP networks without requiring specialized hardware
- Compliant and interoperable with standard NVMe & NVMe-oF specifications
- Portable design across any FPGA platform

SPECIFICATIONS†

USE CASES

- Disaggregated All Flash Arrays
- Fabric-attached Bunch of Flash (FBOF)
- AI-ready Shared Storage System

CAPABILITIES

- 2 NVMe subsystems
- 256 NVMe-oF connections
- 128 entries per NVMe-oF connection
- 32 NVMe SSDs
- 64 hosts sharing the NVMe SSDs
- 128KB MDTS (Maximum Data Transfer Size)
- Active-active/-passive multi-path

NVME COMPATIBILITY

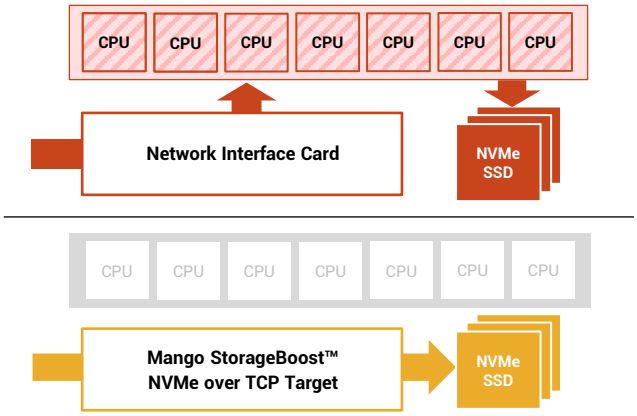
- NVMe 1.4/2.0 compatible
- NVMe-oF 1.1 compatible

INTERFACE & PLATFORM SUPPORT

- PCIe Interface
  - PCIe 3.0 x16 or PCIe 4.0 x8
- Ethernet Interface
  - 2x 100GbE QSFP28
  - Direct-attach copper or optical transceiver
- Hardware Platform
  - Intel/Altera Agilex™ FPGAs
  - AMD/Xilinx Alveo™ FPGAs

† The specifications above are part of the base configuration. Other configurations are available upon request.

DESIGN OVERVIEW

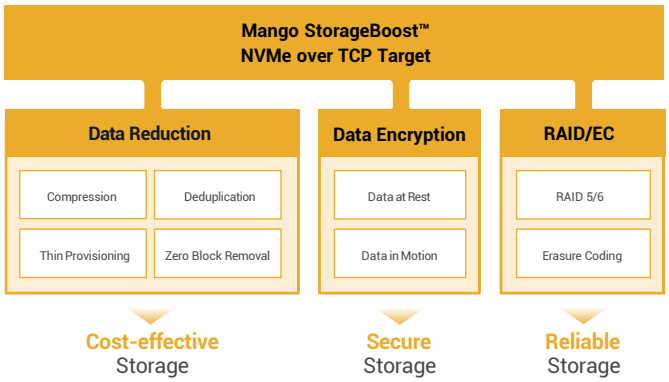


Zero-CPU I/O Path

Mango StorageBoost™ – NTT is a zero-CPU solution that fully offloads the NVMe/TCP I/O stack. Built on MangoBoost's TCP/IP Offload Engine (TOE), the NVMe/TCP offload engine efficiently converts TCP payloads from the NVMe-oF protocol to the NVMe protocol, allowing communication with NVMe SSDs. This process is achieved through PCIe peer-to-peer communication, completely eliminating the need for CPU involvement. The significant reduction in CPU usage enables administrators to deploy lightweight storage servers, lowering total cost of ownership (TCO) without sacrificing performance.

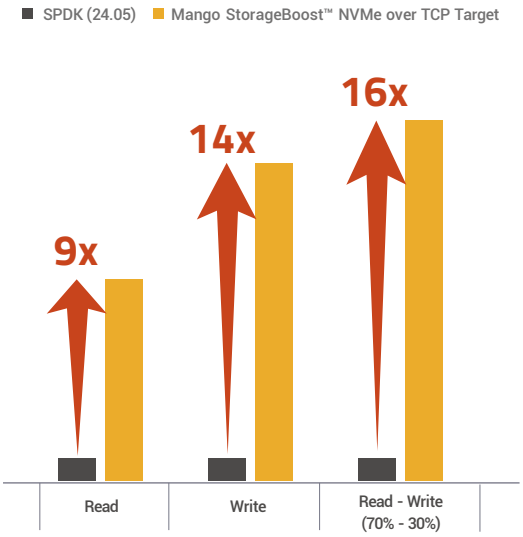
Flexible Storage Solution

Mango StorageBoost™ – NTT is designed with a modular architecture, enabling the integration of various storage features to meet specific requirements. This allows storage servers to be tailored with feature combinations such as data reduction for cost efficiency, data encryption for securing sensitive information, and RAID or erasure coding for enhanced reliability and availability. The flexibility offered by NTT ensures that user-driven storage systems can easily adapt to the evolving demands of modern datacenters.

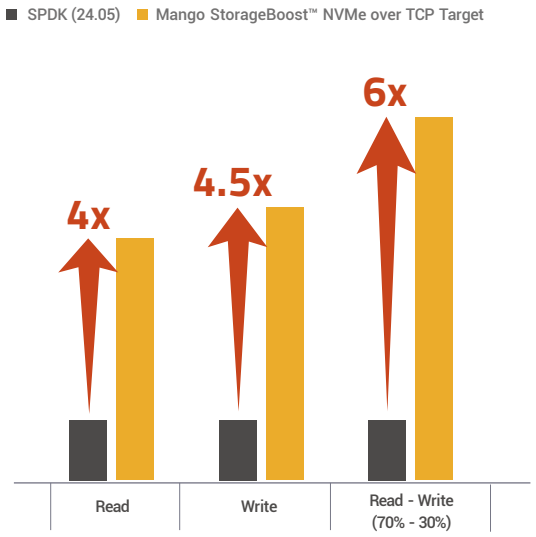


EVALUATION RESULTS

Performance per Core



Performance per Power†



† Only the power used by components directly involved in the actual data processing was considered. These include CPU, memory, NIC, and FPGA.

DISCLAIMERS

The performance claims in this document are based on the internal cluster environment. Actual performance may vary depending on the server configuration. Software and workloads used in performance tests may have been optimized for performance only on MangoBoost products. Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. Results that are based on pre-production systems and components as well as results that have been estimated or simulated using MangoBoost reference platform for informational purposes only. Results may vary based on future changes to any systems, components, specifications, or configurations. Statements in this document that refer to future plans or expectations are forward-looking statements. These statements are based on current expectations and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. MangoBoost does not guarantee any specific outcome. Nothing contained herein is, or shall be relied upon as, a promise or representation or warranty as to future performance of MangoBoost or any MangoBoost product. The information contained herein shall not be deemed to expand in any way the scope or effect of any representations or warranties contained in the definitive agreement for MangoBoost products.