

OVERVIEW

SANBlaze SBExpress for NVMe over Fabrics (NVMe-oF) is the key piece of test equipment for anyone developing products supporting the NVMe-oF storage protocol using RoCE/RDMA or TCP. The software feature set provides a unique set of functions applicable in all aspects of a product lifecycle; from development to design validation to test and QA. The ability to emulate **NVMe-oF targets** and **initiators** with a wide range of configurable attributes provides engineers with a flexible, scalable tool to simulate real-world environments and test director class switch environments at a fraction of the cost of real devices.

The SBExpress software provides full control and programmability of NVMe-oF parameters, providing unique storage test conditions for testing and development.

Easily configurable target environments can be edited and saved for reuse. Multiple error conditions and triggers allow for complex error injection. RAM based targets provide low latency targets for performance testing. Very complex error conditions can be simulated to provide a unique platform for backplane and controller testing. The ability to program complex and varying ranges of target configurations and save and restore multiple target configurations provides a flexible, cost effective and invaluable tool for development, test & QA labs.

Initiator emulation delivers the ability to drive NVMe-oF traffic, inject errors, send specific or custom op codes in an easy to use, scriptable platform. The ability to affect fabric login parameters is useful in switch and fabric testing and development. Custom command generation and predefined tests provide simulated host environments. Auto connect and probe features quickly identify targets to test. Features such as Read/Write/Compare testing, error injection and a custom command builder provide an environment to simulate single or multiple NVMe-oF hosts.

Test cases can be saved and restored with a single command. Tests can be started via command line, scripted or via an easy to use Web based interface.

FEATURES

- Support for 200G, 100G, 50G, 25G Ethernet
- RoCE/RDMA and TCP
- Simulated NVMe-oF SSD storage devices
- Simulated Hosts
- High performance
- Error injection
- Packet Capture and Decode
- Easy to use Web based interface
- Command line interface and scripting
- Save/load configurations
- Trace Functionality
- Error counters
- Real time statistics and performance data

KEY APPLICATIONS

- NVMe-oF Hardware and Software Development
- Validate and test NVMe-oF hosts
- Validate and test NVMe-oF storage arrays
- Switch and Fabric testing
- Storage software verification
- Management software verification
- Performance testing
- Error handling testing
- Failover and Multipath Simulation
- Scalability testing
- Capacity planning

HARDWARE OPTIONS

- 200G, 100G, 50G and 25G auto-negotiable speed
- 2, 4, 8, or 12 ports per system (depending on link speed)

GENERAL EMULATION FEATURES

- Configurable NQN
- T10 DIF emulation including inbound and outbound verification
- Configurable MTU size
- Configurable DCBX version and parameters
- Ability to send PFC Pause
- Reservation Support

TARGET FEATURES

- Up to 1024 Namespaces per port
- Real device emulation mode where all data is retained
- Virtual Device emulation for Namespaces up to 2PB
- SSD storage emulation
- Near line rate performance
- Configuration and Data Retention via Save/Load to disk function
- Real time statistics
- T10 DIF emulation including inbound and outbound verification
- Configurable Namespace parameters:
 - Speed
 - Size
 - Personality
 - Errors

INITIATOR FEATURES

- Single button "Max Reads all Ports" testing for quick go/no-go
- Read / Write and Compare Tests for traffic generation and data integrity
- Sequential, random, Min/Max and Butterfly seeks
- Multiple data patterns including Random and User Defined
- Multi-path testing on all paths, one path, active path, optimal path
- Comprehensive "Generic" I/O capability
- Compression and Dedup Data Patterns
- Namespace management

REAL TIME STATISTICS INCLUDING:

- I/O Performance Counters
- Outstanding I/O Count
- Network Counters

CONFIGURABLE ERROR CAPABILITIES INCLUDE:

- Drop
- Abort
- Read/Write /Delay
- Read Over/Read Under
- Write Over/Write Under
- Out of Order Data
- Data Corruption
- NVMe SCT/SC
- Bad Block
- Bad T10 DIF inbound/outbound
- Link Reset

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