NVM Express Releases NVM Express Specifications to Unify AI, Cloud, Client, and Enterprise Storage

Key storage features include Live Migration, Computational Storage, and a new Host Directed Data Placement Technology

BEAVERTON, OR. — August 6, 2024 — NVM Express, Inc. today announced the release of three new specifications and eight updated specifications. This update to NVMe technology builds on the strengths of previous NVMe specifications, introducing significant new features for modern computing environments while also streamlining development and time to market.

“Beginning as a single PCIe® SSD specification, NVMe technology has grown into nearly a dozen specifications, including multiple command sets, that provide pivotal support for NVMe technology across all major transports and standardize many aspects of storage,” said Peter Onufryk, NVM Express Technical Workgroup Chair. “NVMe technology adoption continues to grow and has succeeded in unifying client, cloud, AI and enterprise storage around a common architecture. The future of NVMe technology is bright and we have 75 new authorized technical proposals underway.”

NVM Express Specifications Target Streamlined Development

The latest NVMe specifications consist of multiple documents targeted at allowing faster and simpler development of NVMe architecture. The three new specifications are the NVMe Boot specification, the Subsystem Local Memory command set and the Computational Programs command set. The updated specifications are the NVMe 2.1 Base specification, Command Set specifications (NVM Command Set, ZNS Command Set, Key Value Command Set), Transport specifications (PCIe Transport, Fibre Channel Transport, RDMA Transport and TCP Transport) and the NVMe Management Interface specification.

Key New NVMe Capabilities

- Enabling live migration of PCIe NVMe controllers between NVM subsystems.
- New host-directed data placement for SSDs that simplifies ecosystem integration and is backwards compatible with previous NVMe specifications.
- Support for offloading some host processing to NVMe storage devices.
- A network boot mechanism for NVMe over Fabrics (NVMe-oF™).
- Support for NVMe over Fabrics zoning.
- Ability to provide host management of encryption keys and highly granular encryption with Key Per I/O.
- Security enhancements such as support for TLS 1.3, a centralized authentication verification entity for DH-HMAC-CHAP, and post sanitization media verification.
- Management enhancements including support for high availability out-of-band management, management over I3C, out-of-band management asynchronous

events and dynamic creation of exported NVM subsystems from underlying NVM subsystem physical resources.

The NVM Express specifications and the new feature specifications are available for download on the NVM Express website.

To learn more about the newly released NVMe features, attend the NVM Express sponsored presentation track on August 7 at FMS 2024.

About NVM Express, Inc.

With more than 100 members, NVM Express, Inc. is a non-profit organization focused on enabling broad ecosystem adoption of high performance and low latency non-volatile memory (NVM) storage through a standards-based approach. The organization offers an open collection of NVM Express® (NVMe®) specifications and information to fully expose the benefits of non-volatile memory in all types of computing environments from mobile to data center. NVMe-based specifications are designed from the ground up to deliver high bandwidth and low latency storage access for current and future NVM technologies. For more information, visit http://www.nvmexpress.org.

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