

NVMe over Fabrics Technology - Official Technical Overview & Hardware Datasheet

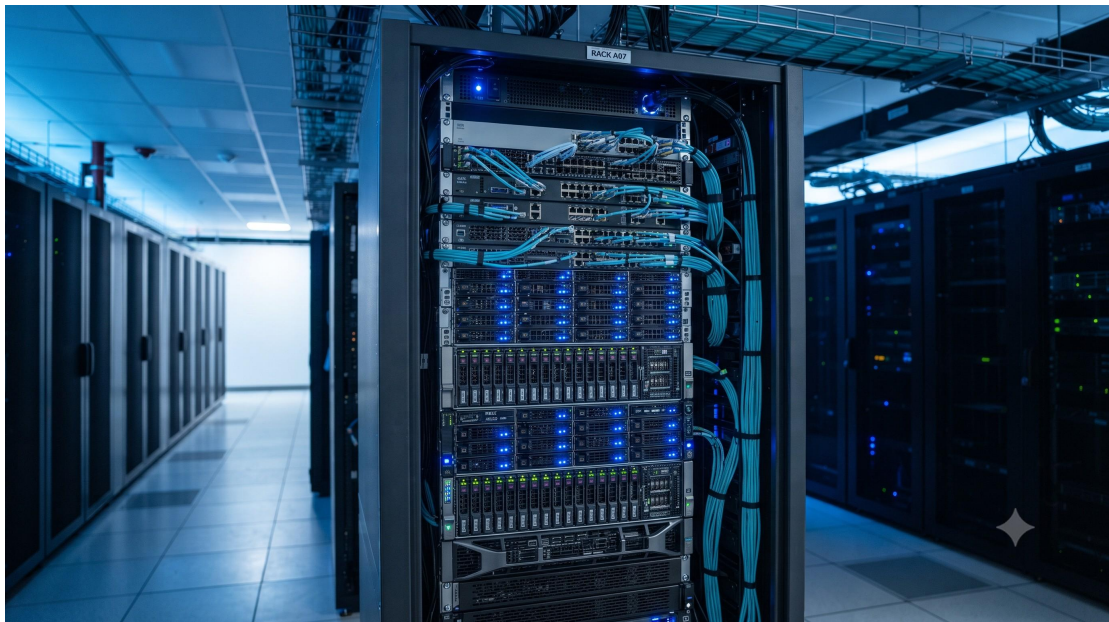
EXECUTIVE SUMMARY

This document serves as the official technical overview and hardware datasheet for the implementation of NVMe over Fabrics (NVMe-oF) technology within our carrier-grade storage networking infrastructure. As the industry transitions towards disaggregated, high-performance storage architectures, NVMe-oF stands as the pivotal protocol enabling efficient, low-latency access to NVMe storage devices across a network fabric. This whitepaper details our hardware platform's architecture, performance specifications, and compliance standards, positioning it as the premier solution for modern, data-intensive enterprise and cloud environments.

ARCHITECTURE & CHASSIS DESIGN

The platform is engineered around a purpose-built, high-density chassis design that prioritizes both performance and serviceability. The modular architecture supports up to four independent, hot-swappable controller nodes, each equipped with the latest generation of programmable ASICs designed specifically for NVMe-oF processing. The chassis backplane is a passive, ultra-low impedance design that supports a mesh topology, providing

non-blocking, any-to-any connectivity between controller nodes, storage devices, and external network interfaces. This design minimizes latency jitter, which is critical for maintaining consistent Quality of Service (QoS) under heavy load.



HARDWARE FEATURES

The hardware platform integrates a suite of advanced features to maximize performance and ensure data integrity. Key hardware components include:

- Controller ASICs: Custom-designed, multi-core processors with hardware acceleration for PCIe and RDMA (Remote Direct Memory Access) protocols, enabling wire-speed processing of NVMe commands.
- Network Interfaces: Dual-port 100/200/400 Gigabit Ethernet adapters

supporting RoCE v2 (RDMA over Converged Ethernet) and iWARP, providing flexible fabric connectivity.

- Memory Subsystem: Large, high-speed DDR4/DDR5 memory buffers for intelligent command queuing, flow control, and caching, significantly reducing system overhead.

- Storage Interface: Front-accessible bays supporting up to 24/48 U.2/U.3 NVMe SSDs per chassis, with direct PCIe Gen4/Gen5 lanes to the controller nodes, eliminating traditional SAS/SATA bottlenecks.

COMPLIANCE & STANDARDS

Our platform is rigorously tested and certified to meet the most stringent industry and regulatory standards. Compliance ensures seamless integration into existing data center environments and guarantees operational reliability. The platform adheres to NVMe 1.4 and NVMe-oF 1.1 specifications, ensuring interoperability with a wide range of enterprise storage solutions and operating systems. It holds certifications for UL, CE, FCC, and is designed to comply with the security requirements of NIST SP 800-131A. Additionally, the platform is NEBS (Network Equipment Building System) Level 3 certified, making it suitable for deployment in central offices and other demanding telecom environments.

TECHNICAL SPECIFICATIONS

The following table provides a comprehensive overview of the core hardware specifications for the NVMe-over-Fabrics platform.

Parameter	Specification
Form Factor	2RU Chassis / 4 Node Modular
Switching Capacity	12.8 Tbps (Full Duplex)
Power Supply	2+2 Redundant, Hot-Swappable AC (200-240V) / DC (-48V)
Controller Nodes	Up to 4, Intel Xeon D-2700 Series
Memory per Node	Up to 256 GB DDR4 ECC
NVMe SSD Support	Up to 24x U.2 / U.3 PCIe Gen4/Gen5
Network Interfaces	Up to 4x 100/200/400GbE RoCE v2 Ports
Operational Temperature	0°C to 40°C
MTBF	1,200,000 Hours

ORDERING OPTIONS

The platform is available in a variety of configurations to suit different performance and capacity requirements. The base chassis, part number

NVMe-oF-CH-16, includes a passive backplane, dual-redundant power supplies, and a fan tray. Controller node options (e.g., CN-A1-M256, CN-A2-D512) offer varying levels of compute and memory resources to support different fabric speeds and concurrent I/O operations. Network interface modules (e.g., 100G, 200G, 400G) are sold separately and are field-replaceable to allow for seamless future upgrades. Our global support infrastructure ensures timely delivery and technical assistance for all ordering options, enabling organizations to right-size their investment based on current and projected workload demands.

