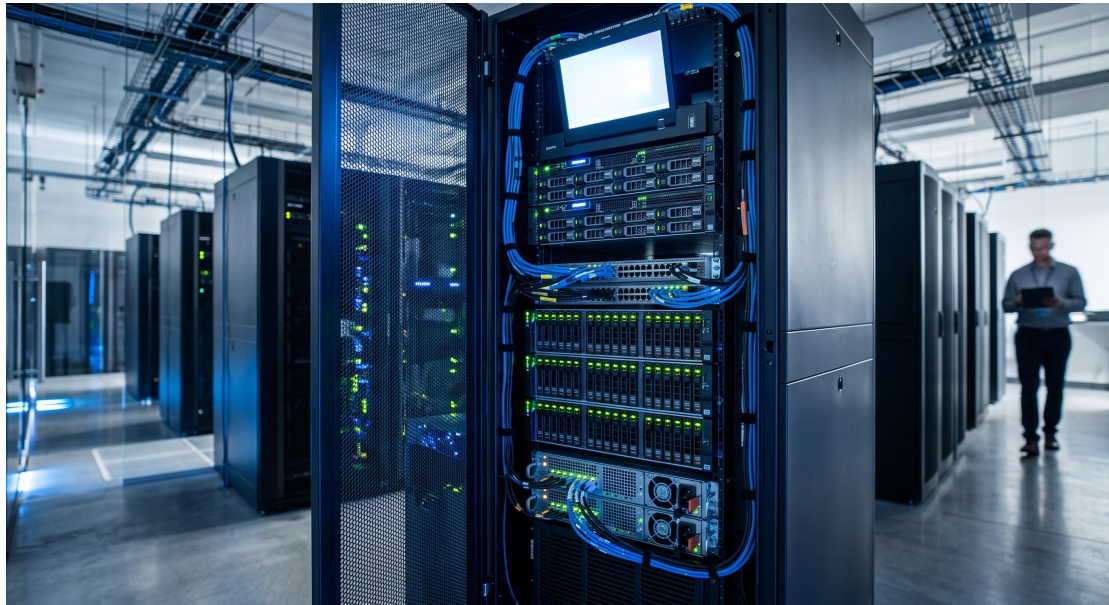


High-Availability Database Storage Guide - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The High-Availability Database Storage Guide defines the reference architecture, hardware specifications, and deployment methodology for mission-critical database workloads requiring continuous availability across carrier-grade and enterprise environments. This document provides a comprehensive technical framework for deploying resilient, high-performance storage subsystems optimized for transactional and analytical database engines, including Oracle RAC, Microsoft SQL Server Always On, PostgreSQL clusters, and NoSQL distributed datastores.

The platform delivers deterministic performance with sub-millisecond latency, active-active controller redundancy, and non-disruptive firmware upgrade capabilities. Designed for 99.9999 percent availability targets, the solution integrates hot-swappable NVMe and SAS storage tiers with intelligent caching algorithms, end-to-end data path protection, and comprehensive telemetry for predictive failure analysis.



ARCHITECTURE & CHASSIS DESIGN

The High-Availability Database Storage Guide platform is built upon a modular, dual-controller chassis architecture that eliminates single points of failure across all critical subsystems. Each storage node features two independent controller modules operating in active-active configuration, with mirrored write-back cache and synchronized configuration state. The chassis supports up to 24 front-accessible drive bays accommodating NVMe U.2, SAS-3, and SATA SSD media in mixed configurations.

The midplane design provides dual-star backplane interconnect topology, ensuring that each drive bay maintains independent paths to both controllers. Power delivery is managed through redundant hot-swappable power supply units with independent AC/DC inputs and automatic load balancing. Thermal

management employs adaptive multi-zone cooling with N+1 fan redundancy and acoustic optimization for datacenter environments.

HARDWARE FEATURES

Key hardware capabilities include:

- Dual active-active storage controllers with 64 GB DDR4 cache per controller
- 24 x 2.5-inch hot-swappable drive bays supporting NVMe, SAS, and SATA
- 8 x 32 Gb Fibre Channel ports and 8 x 25 GbE iSCSI ports per controller
- PCIe Gen4 internal data path with end-to-end parity protection
- Battery-backed cache vaulting with supercapacitor energy modules
- In-band and out-of-band management via 1 GbE service ports
- TPM 2.0 hardware root of trust for secure boot and encryption key storage
- Real-time environmental monitoring with SNMPv3 and RESTful API

COMPLIANCE & STANDARDS

The platform conforms to the following standards and certifications:

- NEBS Level 3 (GR-63-CORE, GR-1089-CORE)
- UL 60950-1, IEC 60950-1, CSA C22.2 No. 60950-1

- FCC Part 15 Class A, EN 55032 Class A, CISPR 22 Class A
- RoHS 2011/65/EU, WEEE 2012/19/EU
- ISO 9001:2015, ISO 14001:2015 manufacturing compliance
- SNIA Swordfish and SMI-S storage management standards
- NVMe-MI 1.1 and NVMe 1.4 command set compliance

TECHNICAL SPECIFICATIONS

The following table summarizes the primary technical parameters of the High-Availability Database Storage Guide platform:

Parameter	Specification
Form Factor	2RU rack-mount chassis with dual controllers
Switching Capacity	Dual active-active controllers, 128 Gb backplane bandwidth per controller
Power Supply	2 x 1600W hot-swappable 1+1 redundant AC/DC PSUs
Cache Memory	64 GB DDR4 per controller, battery-backed write cache
Drive Bays	24 x 2.5-inch hot-swappable NVMe/SAS/SATA

Host Interfaces	8 x 32 Gb FC, 8 x 25 GbE iSCSI per controller
Management Ports	2 x 1 GbE RJ45 service ports per controller
Max Raw Capacity	368 TB with 15.36 TB NVMe drives
RAID Levels	0, 1, 5, 6, 10, 50, 60, and triple-parity RAID
Latency	Sub-200 microsecond read/write at 4K block size
IOPS	Up to 1.2 million random read IOPS per system
Throughput	Up to 24 GB/s sequential read per system
Redundancy	Dual controllers, dual PSU, N+1 cooling, dual-path backplane
Management	SNMPv3, RESTful API, CLI, web GUI, SMI-S
Operating Temperature	5°C to 40°C (41°F to 104°F)
Dimensions	88.9 mm H x 482.6 mm W x 800 mm D
Weight	38 kg fully populated
Compliance	NEBS Level 3, FCC Class A, CE, UL, RoHS, WEEE

ORDERING OPTIONS

Base system configurations include:

- HA-DSG-24NVME-BASE: 2U dual-controller chassis, 24 NVMe bays, 2 x 16 Gb FC, 2 x 10 GbE
- HA-DSG-24SAS-BASE: 2U dual-controller chassis, 24 SAS bays, 4 x 32 Gb FC, 4 x 25 GbE
- HA-DSG-HYBRID-BASE: 2U dual-controller chassis, 12 NVMe + 12 SAS bays, 8 x 32 Gb FC, 8 x 25 GbE

Optional expansion modules:

- HA-DSG-EXP-24: 2U 24-bay SAS expansion enclosure with dual IOM
- HA-DSG-CACHE-128: 128 GB cache upgrade per controller
- HA-DSG-SED-KIT: Self-encrypting drive license and key management bundle
- HA-DSG-REPL-SW: Synchronous replication software license for stretched clusters

