

Storage System

High-Level Technical Requirements

1. Connectivity

- **Protocols:** Concurrent support for Fiber Channel (FC), iSCSI, and NFS from the same capacity pool.
- **Redundancy:** All host-facing ports are redundant, with transparent path failover.
- **Port Per Controller:** Minimum Fiber Channel – 4x 32Gb, iSCSI/NFS – 4x 25Gb. Transceivers should be included.

2. Capacity

- **Usable capacity:** 1 PB. 125TB of data is not applicable to compression and deduplication, rest data can be compressed and deduplicated with factor 2:1.
- **Scalability:** Expandable at least 2 PB without disruption.
- **Efficiency:** Thin provisioning and space reclamation required.

3. Performance

- **Throughput:** At least 10 GB/s sustained (sequential, 256KB block size average).
- **IOPS:** At least 120,000 at 32KB block size, 80/20 read/write mix, with response time ≤ 5 ms at the 95th percentile.
- **Features enabled:** Performance sustained with data-reduction and data-protection features enabled.

Controller failure: Failure of any single controller must cause no degradation of the stated throughput and IOPS. Applies to both active-active and active-passive architectures: in active-active each controller must deliver the full specified performance alone (operating at $\leq 50\%$ utilisation in normal conditions); in active-passive the passive controller must be identically sized and capable of delivering the full performance after takeover.

4. Availability

- **Architecture:** Fully redundant: dual controllers (active-active or active-passive), redundant power, cooling, and network interfaces.
- **Drive protection:** RAID or erasure coding tolerating at least two simultaneous drive failures.
- **Failover:** Transparent to hosts; no I/O interruption beyond standard multipath and NFS retry behavior.
- **Serviceability:** Non-disruptive firmware upgrades, controller replacement, and capacity expansion.

5. Data Protection

- **Snapshots and clones:** Space-efficient, redirect-on-write or equivalent snapshots and clones, with no performance degradation.
- **Replication:** Asynchronous and synchronous replication capability.
- **Encryption:** Data at rest encrypted (AES-256, FIPS-validated).

6. Management and Security

- **Interfaces:** Centralized GUI, CLI, and REST API.
- **Access control:** Active Directory / LDAP integration, role-based access control, and audit logging.
- **Monitoring:** SNMP v3, syslog, email alerting; call-home and predictive capacity/performance analytics.

7. Physical and Environmental

- **Form factor:** Standard 19-inch rack mount.
- **Power:** Redundant Power Supply.

8. Support

- **Coverage:** 24×7 vendor support.
- **Warranty:** Minimum 3-year hardware warranty and software maintenance.