

ZFS Storage Architecture

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Terra utilizes ZFS for primary data storage, leveraging its advanced features for data integrity, snapshots, and caching.

☐☐ Pools

☐☐ `main` (SSD Pool)

- **Hardware:** Raid-Z2 (6x 2TB SSD)
- **Total Capacity:** ~12TB Raw
- **Use Case:** High-performance data, VM disks, Docker root, and active AppData.
- **L2ARC:** 48GB limit (leveraging NVMe partitions).

☐☐ `bulk` (HDD Pool)

- **Hardware:** Raid-Z1 (4x 12TB HDD)
- **Total Capacity:** ~48TB Raw
- **Use Case:** Large media storage, backups, and long-term archival.
- **Special VDEV:** Mirrored NVMe partitions used for metadata offloading to speed up file listing on HDDs.

☐☐ Key Datasets & Mounts

- **/srv:** Docker-compose configuration files (Stored on `main`).
- **/main/appdata:** Primary persistent storage for containers (Stored on `main`).
- **/bulk/pics:** Family photo/video archive (Stored on `bulk`).

☐☐ Health & Maintenance

☐☐ Automated Monitoring (smartd)

Drive health is monitored via `smartmontools` with automated short and long self-tests configured to email results. Test schedules are staggered to prevent resource contention.

- **NVMe (2x 500GB):** Short tests daily at 1am & 2am; Long tests quarterly on the 1st-2nd.
- **HDD (4x 12TB):** Short tests daily at 3am-6am; Long tests on the 4th, 6th, 8th, and 10th of each month.
- **SSD (6x 2TB):** Short tests daily from 1am-6am; Long tests quarterly on the 3rd, 5th, 7th, 9th, 11th, and 12th.

☐☐ ZFS Scrubbing

A scrub is performed automatically on the 3rd Sunday of every month to ensure data integrity and prevent bitrot.

Scrub Schedule (Cron): `24 0 15-21 * * root if [ $(date +%w) -eq 0 ] && [ -x /usr/lib/zfs-linux/scrub ]; then /usr/lib/zfs-linux/scrub; fi`

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