

ZFS

Zettabyte File System

ZFS Futures

- Zpool
- Snapshot
- Zil
- Compression
- Deduplication
- Copy-On-Write
- L2ARC
- Adaptive Replacement Cache (ARC)
- Transaction Group (TXG)
- vdev Types
- Dataset
- Clone
- Checksum
- Dataset Quota
- RAID-Z

ZFS Limits

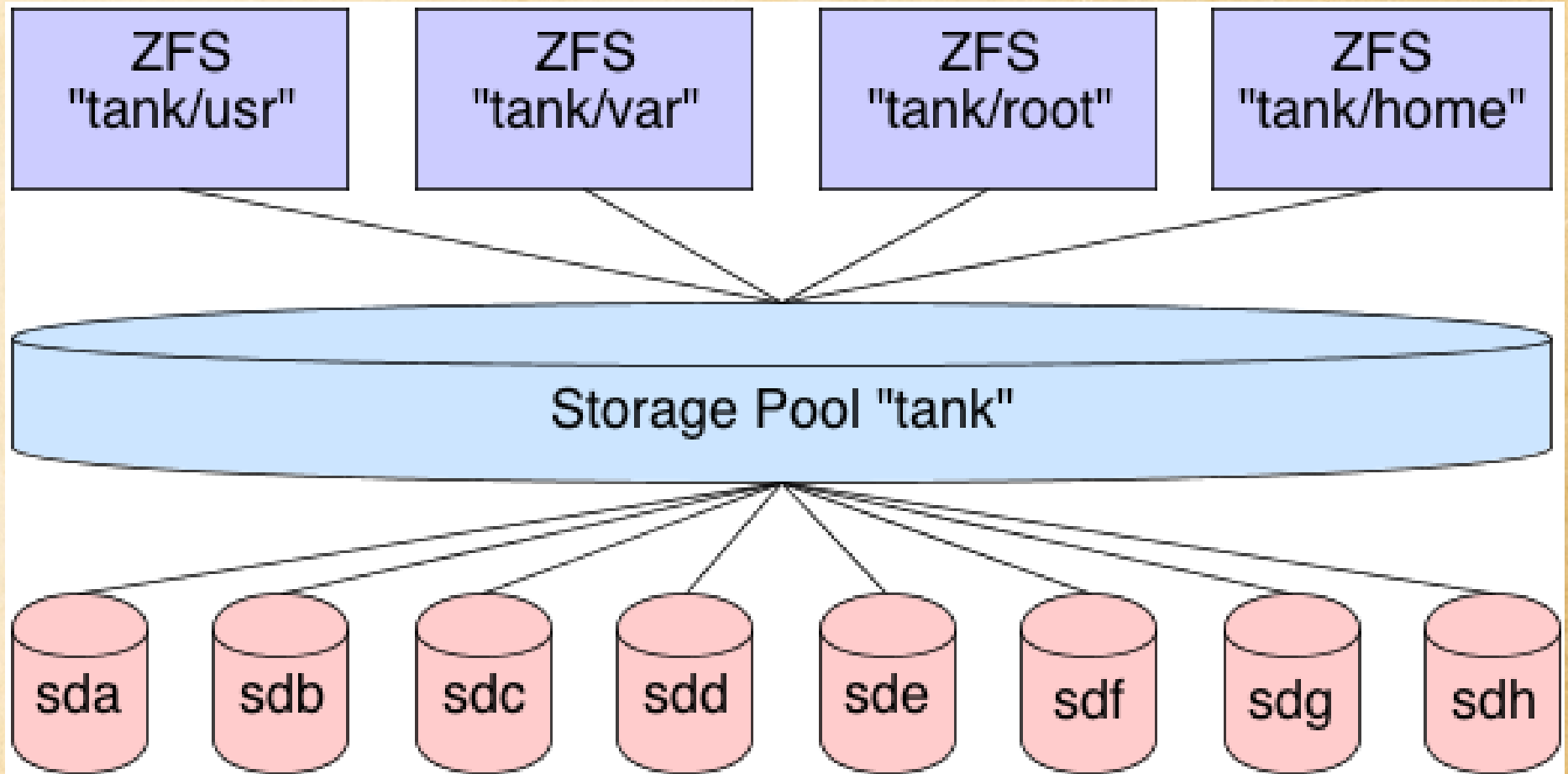
Max. volume size : 256 zebibytes (2^{78} bytes)

Max. file size : 16 exbibytes (2^{64} bytes)

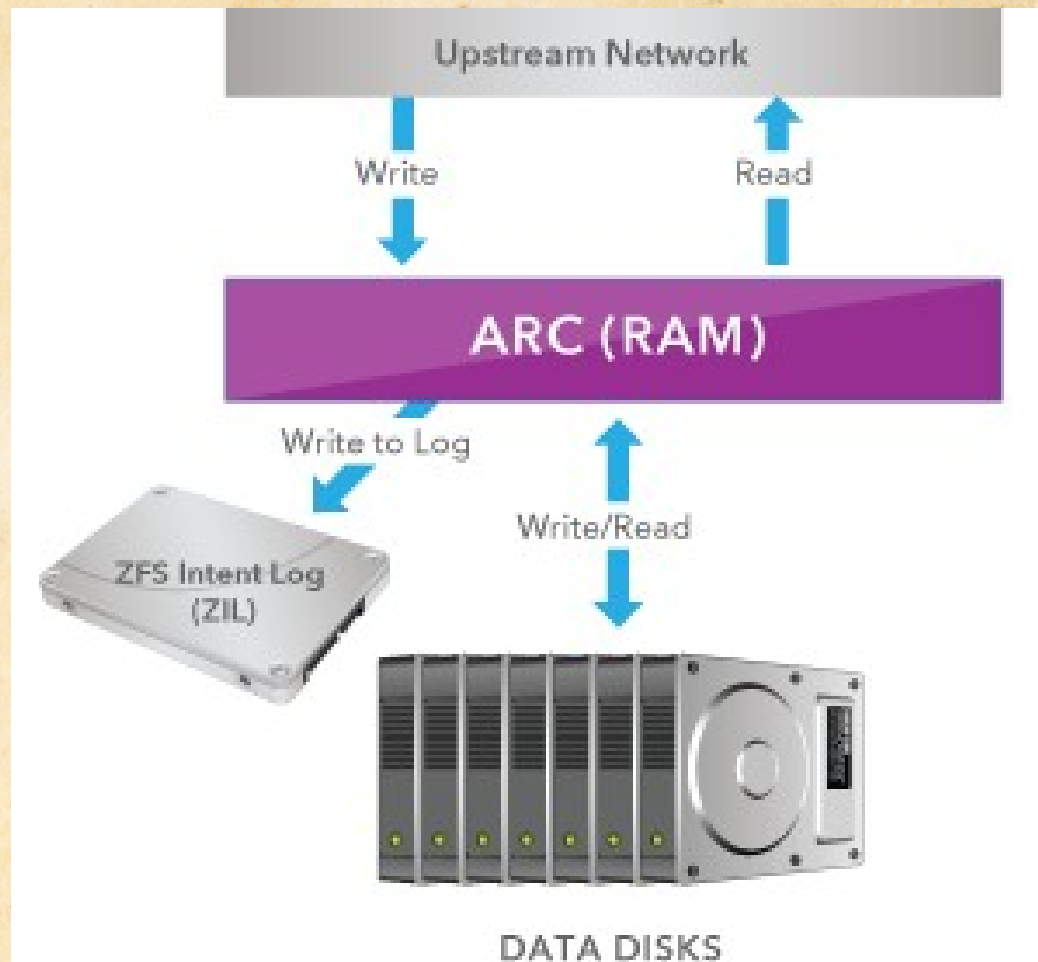
Max. number of files : Per directory: 2^{48}

Per file system : unlimited

ZFS Zpool

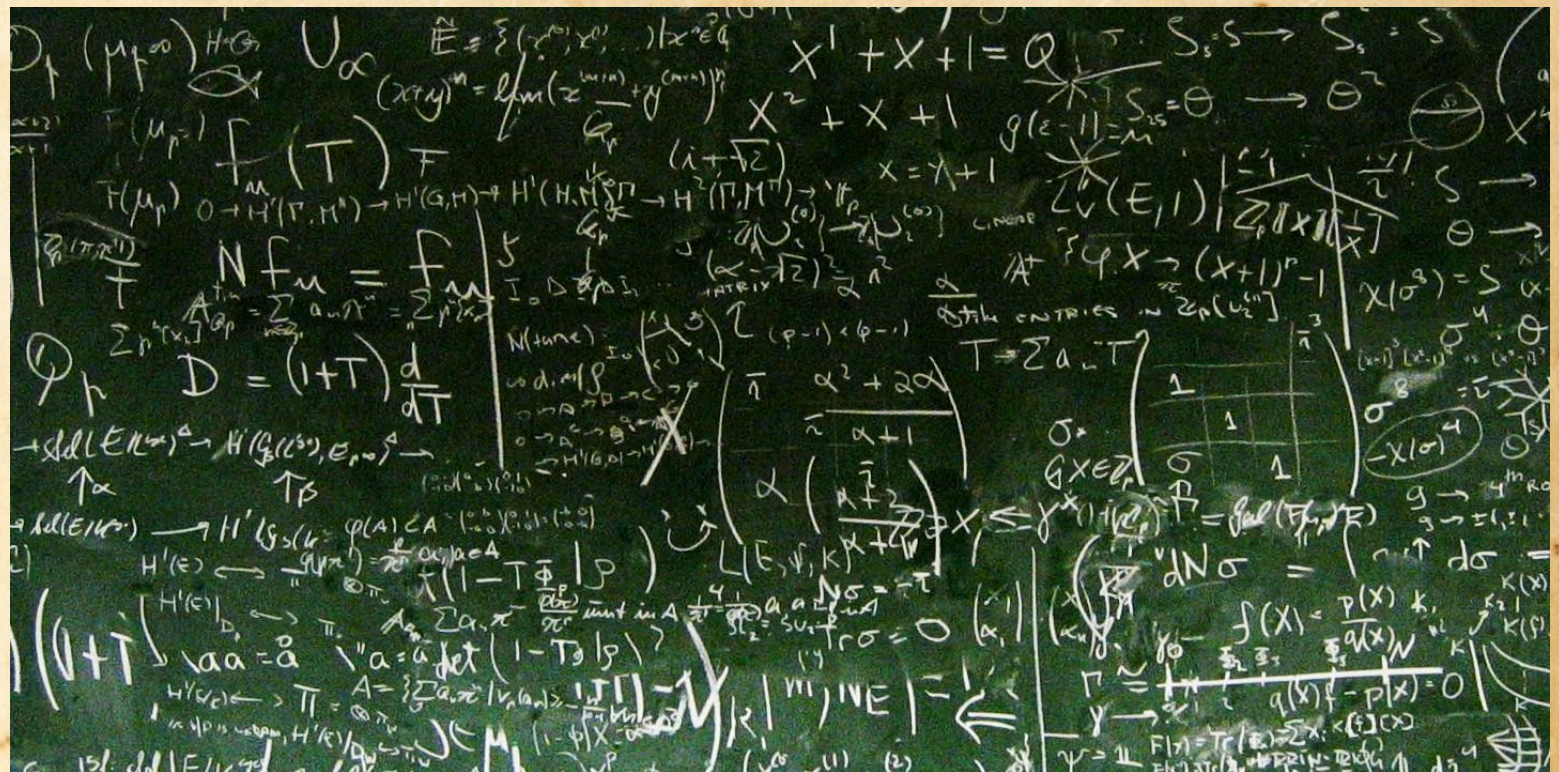


ZFS Zil



ZFS Compression

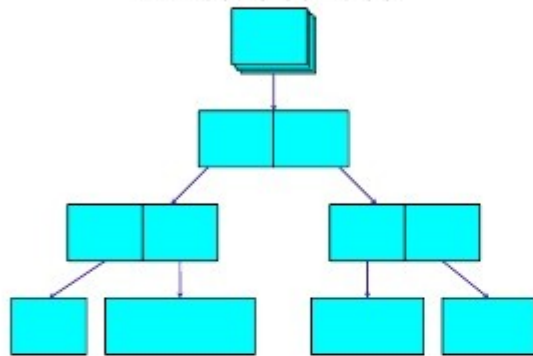
- LZ4
- LZJB
- GZIP
- ZLE



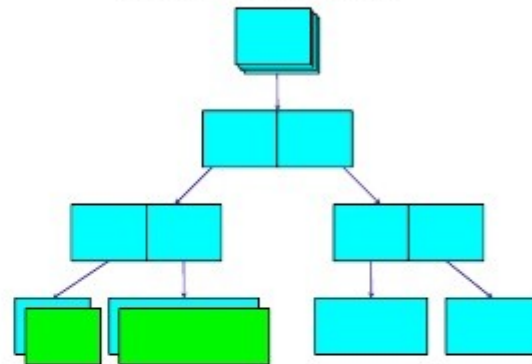
ZFS Copy-On-Write

Copy on Write

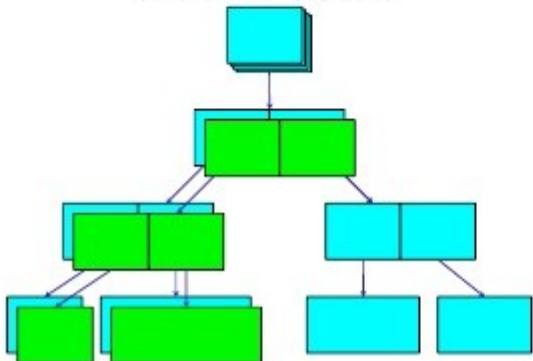
1. Initial block tree



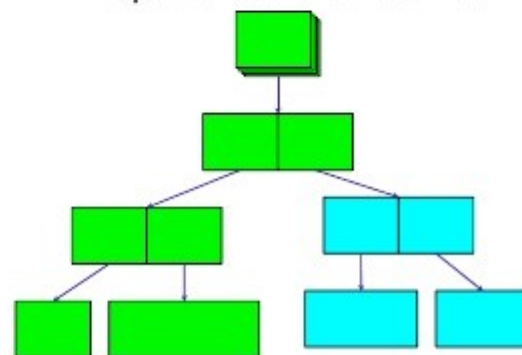
2. COW some data



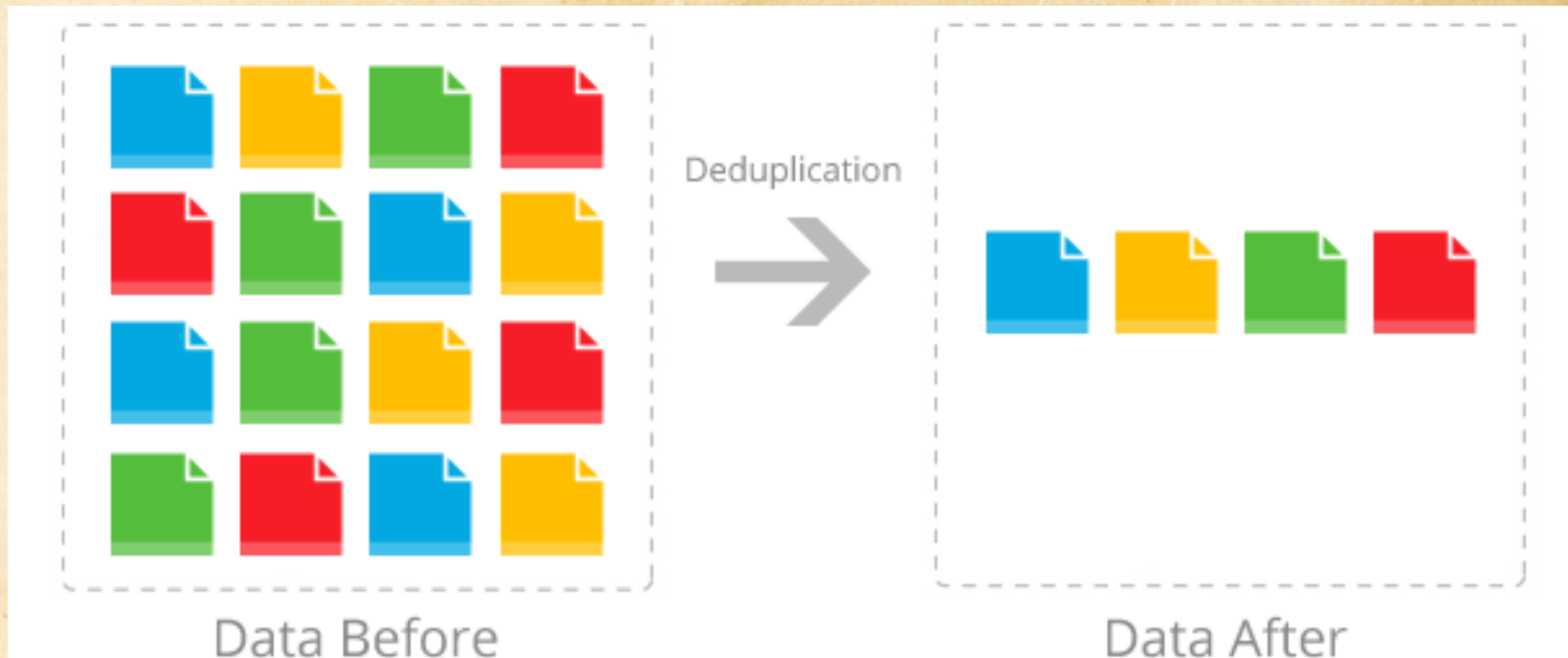
3. COW metadata



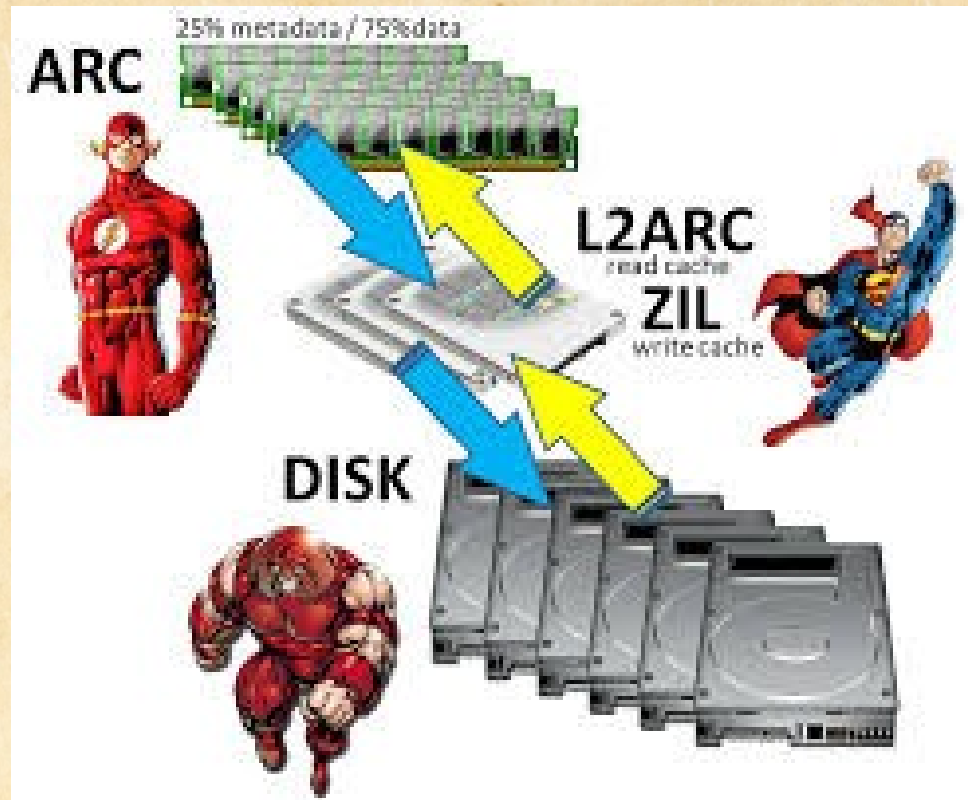
4. Update Uberblocks & free



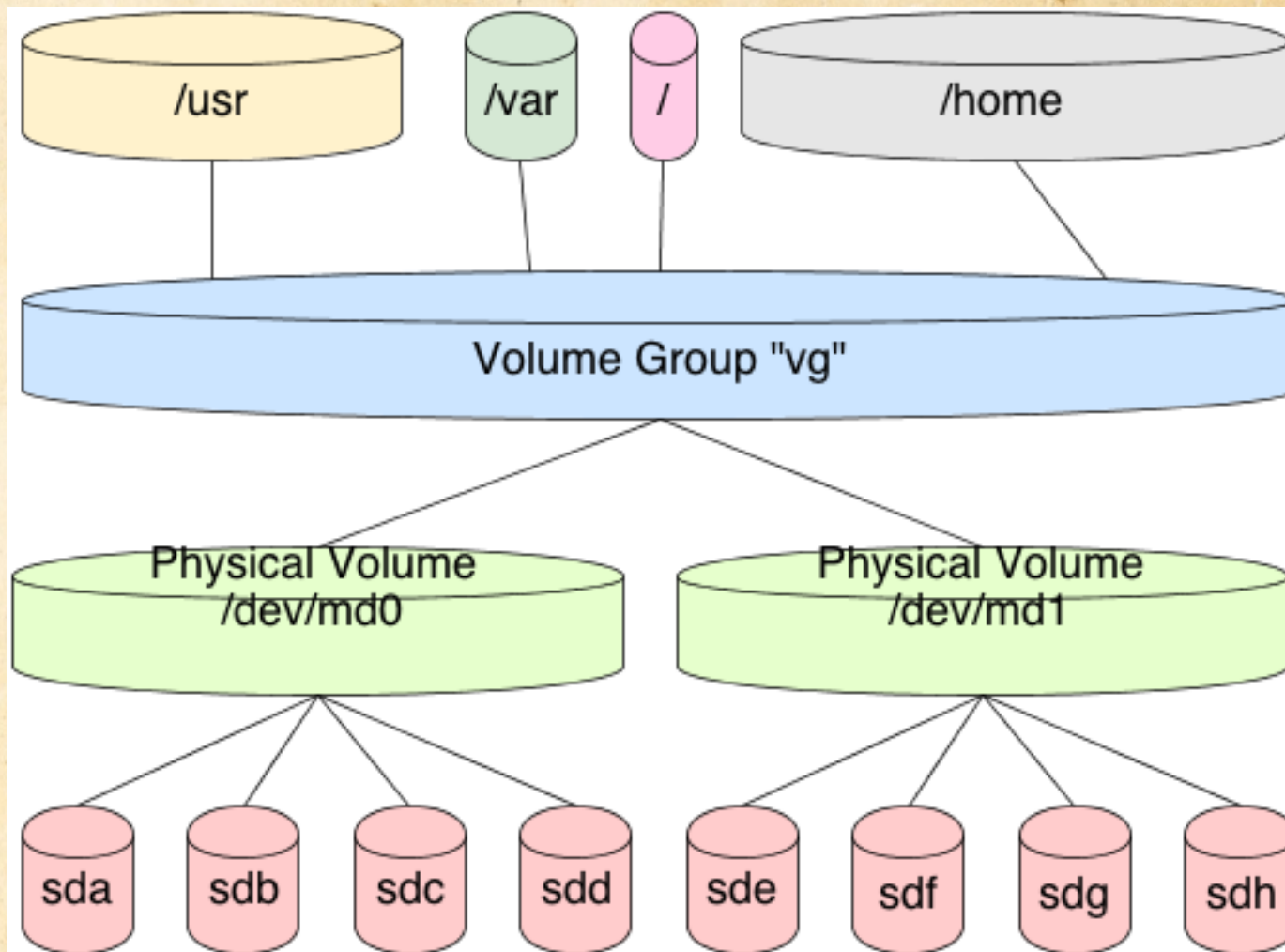
ZFS Deduplication



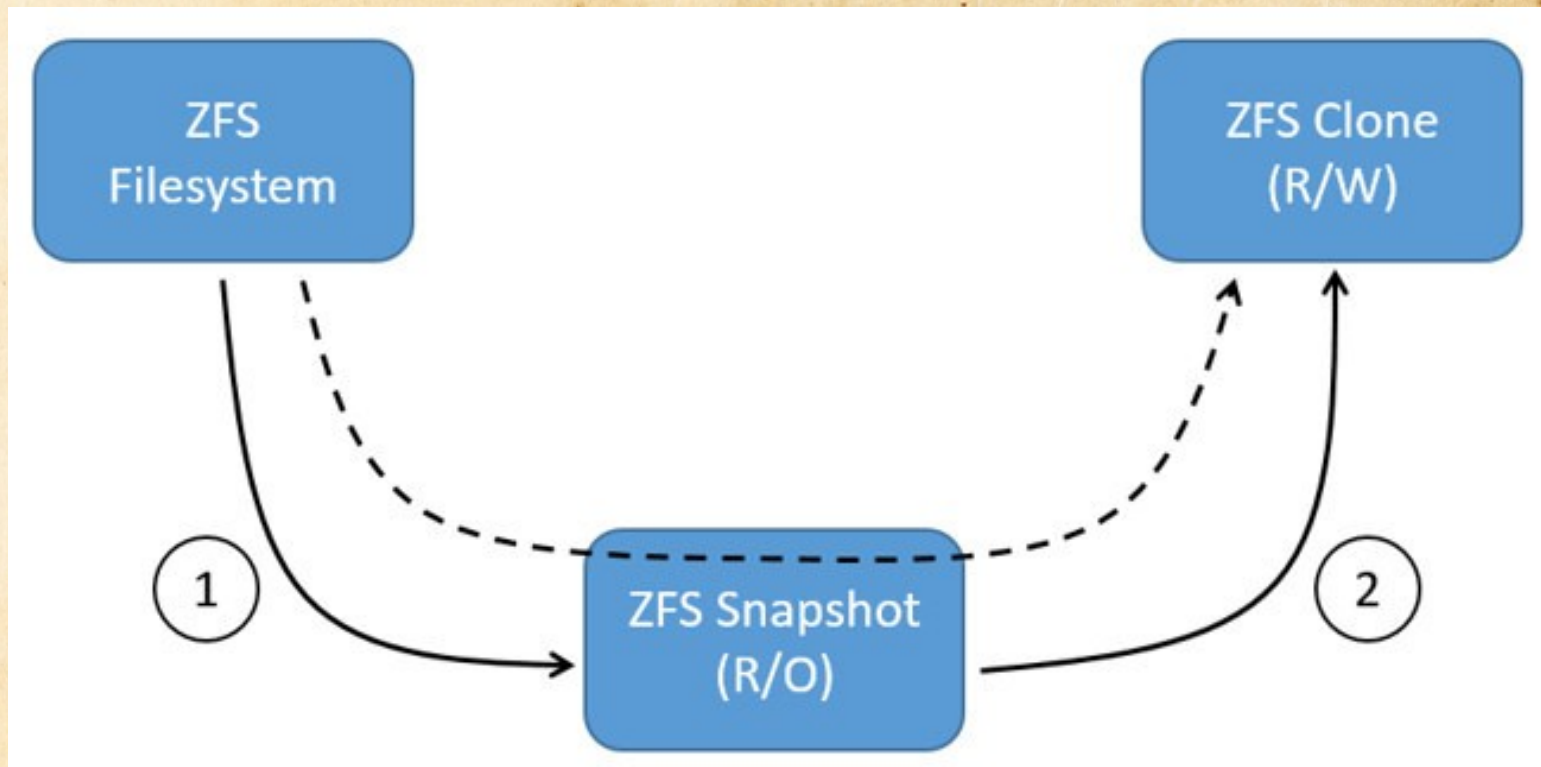
ZFS ARC/L2ARC



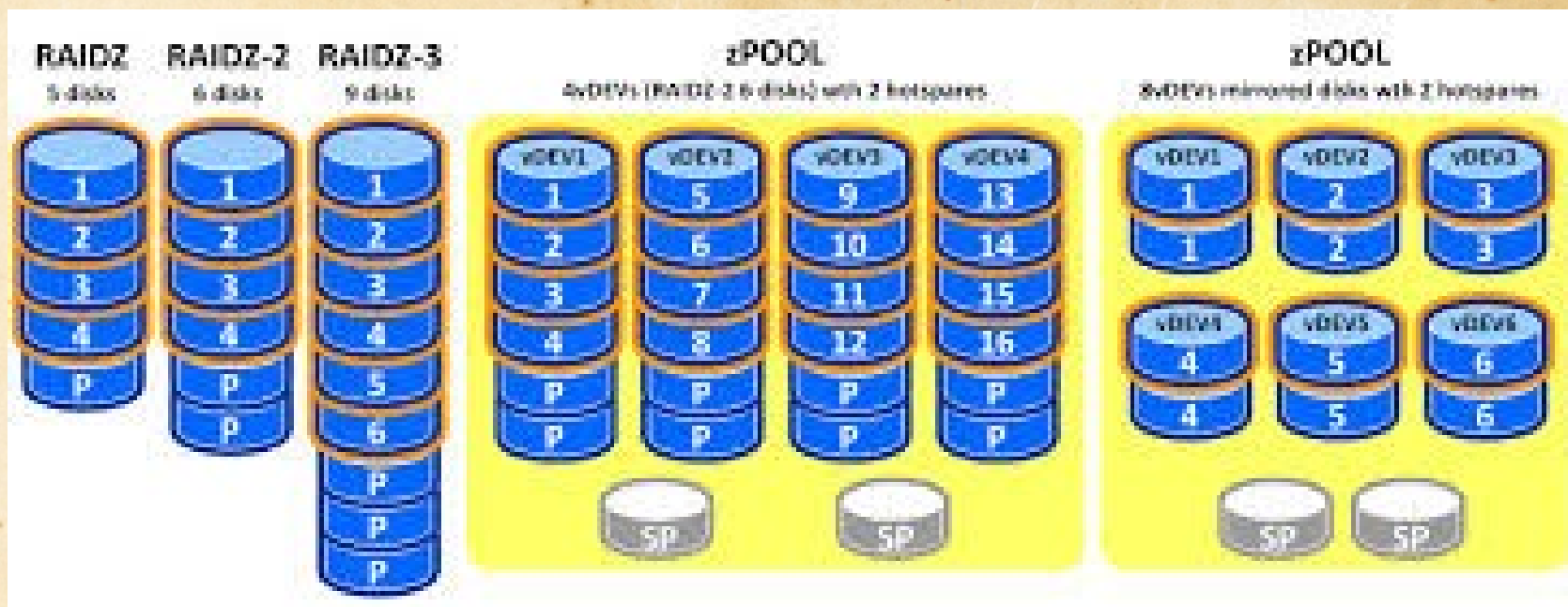
ZFS Dataset



ZFS Clone



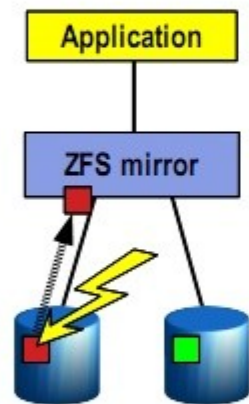
ZFS RAID



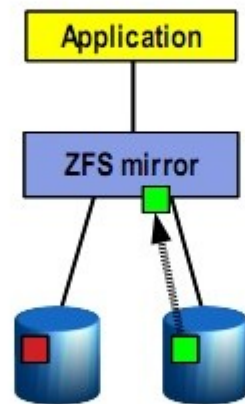
ZFS Checksum

Checksum Verification

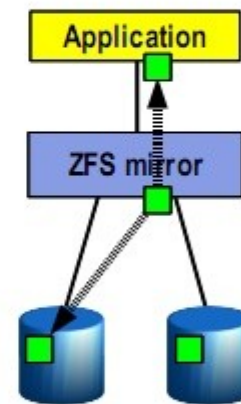
ZFS verifies checksums for every read
Repairs data when possible (mirror, raidz, copies > 1)



Read bad data



Read good data



Repair bad data

ZFS FreeNAS/NAS4Free



FreeNAS webGUI Configuration

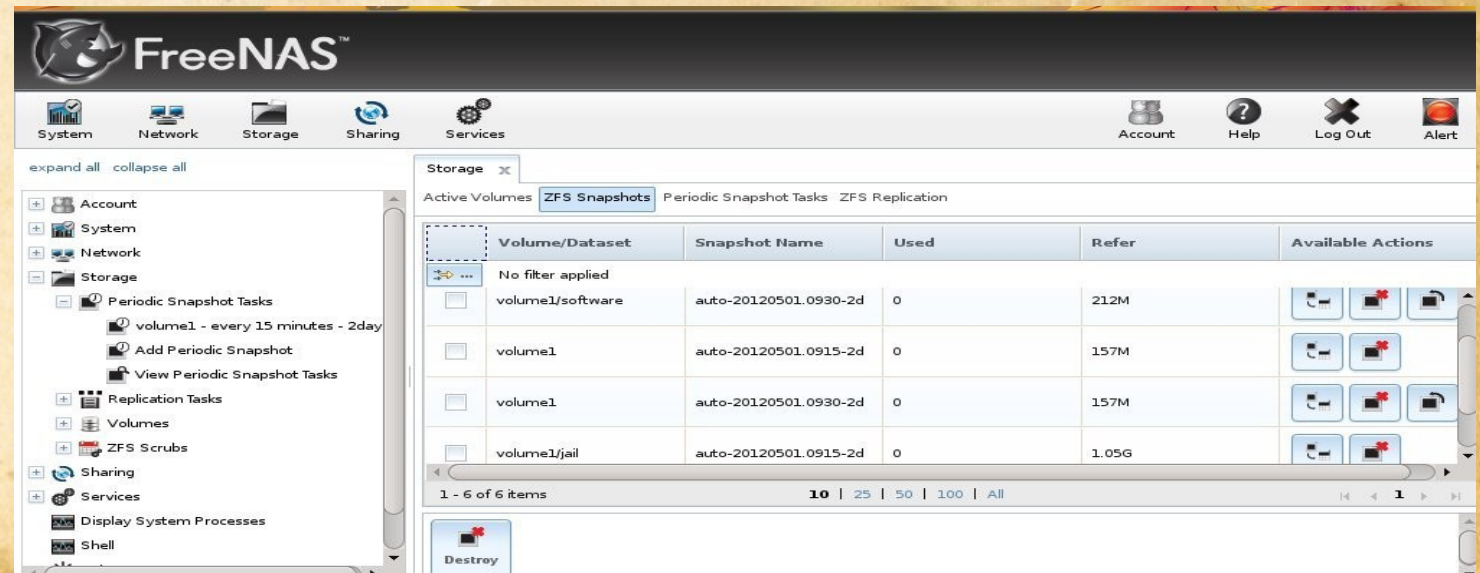
Disks: ZFS: Pools: Pool

Pool: **Default**

Virtual device Pool Tools Information Statistics

Name	Size	Used	Avail	Cap	Health	Actions
zroot	1.2M	1.1M	1.2M	17%	ONLINE	[Refresh] [Refresh] [Refresh]

System General Advanced GUIs: Pooling Files Packages Firmware Backup/Restore Factory Defaults Mounts Hardware Interfaces Management LAN Data Management Software RAID Encryption DNS Procs Mail Root



FreeNAS™

System Network Storage Sharing Services Account Help Log Out Alert

expand all collapse all

- Account
- System
- Network
- Storage
 - Periodic Snapshot Tasks
 - volume1 - every 15 minutes - 2day
 - Add Periodic Snapshot
 - View Periodic Snapshot Tasks
 - Replication Tasks
 - Volumes
 - ZFS Scrubs
- Sharing
- Services
 - Display System Processes
 - Shell

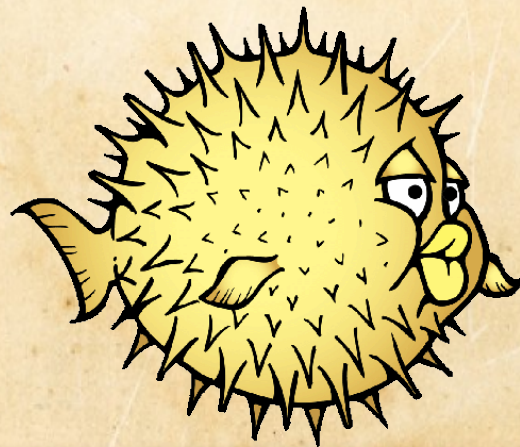
Storage x

Active Volumes ZFS Snapshots Periodic Snapshot Tasks ZFS Replication

Volume/Dataset	Snapshot Name	Used	Refer	Available Actions
No filter applied				
<input type="checkbox"/> volume1/software	auto-20120501.0930-2d	0	212M	[Refresh] [Refresh] [Refresh]
<input type="checkbox"/> volume1	auto-20120501.0915-2d	0	157M	[Refresh] [Refresh] [Refresh]
<input type="checkbox"/> volume1	auto-20120501.0930-2d	0	157M	[Refresh] [Refresh] [Refresh]
<input type="checkbox"/> volume1/jail	auto-20120501.0915-2d	0	1.05G	[Refresh] [Refresh] [Refresh]

1 - 6 of 6 items 10 | 25 | 50 | 100 | All

Destroy



*Open*BSD

OpenBSD

Theo de Raadt

October 1995



OpenBSD

Pay attention to security problems and fix them before anyone else does
(Try to be the #1 most secure operating system.)

Provide the best development platform possible

Integrate good code from any source with acceptable licenses

Greater integration of cryptographic software.

Track and implement standards (ANSI, POSIX, parts of X/Open, etc.)

Work towards a very machine independent source tree

Be as politics-free as possible; solutions should be decided on the basis of technical merit.

Focus on being developer-oriented in all senses, including holding developer-only events called **hackathons**

Do not let serious problems sit unsolved.


Make a CDROM-based release approximately every six months.

OpenBSD "Secure by Default"



To ensure that novice users of OpenBSD do not need to become security experts overnight (a viewpoint which other vendors seem to have), we ship the operating system in a Secure by Default mode. All non-essential services are disabled. As the user/administrator becomes more familiar with the system, he will discover that he has to enable daemons and other parts of the system. During the process of learning how to enable a new service, the novice is more likely to learn of security considerations.

This is in stark contrast to the increasing number of systems that ship with NFS, mountd, web servers, and various other services enabled by default, creating instantaneous security problems for their users within minutes after their first install.



OpenBSD Related projects

CARP

LibreSSL

OpenSSH

OpenBGPD

OpenIKED

OpenOSPFD

OpenNTPD

OpenSMTPD

PF

sndio

spamd


Systrace

tmux

Xenocara

cwm

W^X



End!