ZFS Pools and snapshots

CONCEPTS

Two commands: zpool manages disks and pools, zfs manages datasets (filesystems, volumes, snapshots) inside them.

Disks vdevs: mirror, raidz
↓ zpool create
Pool shared storage
↓ zfs create
Dataset filesystem or zvol
↓ zfs snapshot
Snapshot read-only, cheap
↓ zfs clone / send
Clone / stream writable copy or backup

Datasets are cheap and inherit properties from their parent: make one per thing you want to snapshot, quota or tune separately.

POOLS

zpool status
Health, errors and scrub state

zpool status -x
Show only unhealthy pools

zpool list
Size, used, free and health per pool

zpool create *<pool>* **mirror** *<disk1>* *<disk2>*
Create a mirrored pool

zpool create *<pool>* **raidz** *<disk1>* *<disk2>* *<disk3>*
Create a raidz pool

zpool create -o ashift=12 *<pool>* *<disk>*
Force 4K sector alignment

zpool scrub *<pool>*
Verify all checksums, repair from redundancy

zpool import
List pools available to import

zpool import *<pool>*
Import a pool

zpool import -d /dev/disk/by-id *<pool>*
Import searching a given directory

zpool export *<pool>*
Cleanly detach a pool

POOLS (cont.)

zpool iostat -v *<pool>* **5**
Per-vdev I/O every 5 seconds

zpool history *<pool>*
Show commands run against the pool

zpool clear *<pool>*
Reset error counters after a fault

zpool replace *<pool>* *<old>* *<new>*
Swap a failed or old disk

zpool offline *<pool>* *<disk>*
Take a disk offline

zpool attach *<pool>* *<disk>* *<new>*
Add a mirror side to a disk

zpool add *<pool>* **mirror** *<d1>* *<d2>*
Add a top-level vdev

zpool add -n *<pool>* *<vdev>* *<disks>*
Dry-run adding a vdev

DATASETS

zfs list
List filesystems and volumes

zfs list -r *<pool>*
List a pool's datasets recursively

zfs create *<pool>*/*<name>*
Create a filesystem

zfs create -p *<pool>*/*<a>*/*<b>*
Create with missing parents

zfs create -V *<size>* *<pool>*/*<vol>*
Create a block volume (zvol)

zfs destroy *<dataset>*
Delete a dataset

zfs destroy -rn -v *<dataset>*
Dry-run a recursive destroy

zfs list -o space
Space broken down by use

PROPERTIES

zfs get all *<dataset>*
Show every property

zfs get *<prop>* *<dataset>*
Show one property

zfs set compression=lz4 *<dataset>*
Enable compression

PROPERTIES (cont.)

zfs set mountpoint=*<path>* *<dataset>*
Change where it mounts

zfs set quota=*<size>* *<dataset>*
Cap a dataset's size

SNAPSHOTS AND CLONES

zfs snapshot *<dataset>*@*<name>*
Create a snapshot

zfs snapshot -r *<pool>*@*<name>*
Snapshot a pool and all children

zfs list -t snapshot
List snapshots

zfs rollback *<dataset>*@*<snap>*
Revert to a snapshot

zfs destroy *<dataset>*@*<snap>*
Delete a snapshot

zfs clone *<dataset>*@*<snap>* *<pool>*/*<new>*
Writable copy of a snapshot

Browse old versions without rolling back: read-only copies sit under <mountpoint>/.zfs/snapshot/<name>/.

SEND AND RECEIVE

zfs send *<dataset>*@*<snap>* **| zfs recv** *<pool>*/*<name>*
Copy a snapshot locally

zfs send *<dataset>*@*<snap>* **| ssh** *<host>* **zfs recv** *<pool>*/*<name>*
Replicate to another machine

zfs send -i *<old>* *<new>* **| zfs recv** *<ds>*
Send only changes between snapshots

ENCRYPTION

zfs create -o encryption=on -o keyformat=passphrase *<pool>*/*<name>*
Create an encrypted dataset

zfs load-key *<dataset>*
Unlock a dataset