btrfs Copy-on-write filesystem

CONCEPTS

A subvolume looks like a directory but snapshots, quotas and send work per subvolume. Snapshots are cheap copy-on-write clones.

Filesystem one or more devices
- **Subvolume** top-level (ID 5) and children
  - **Snapshot** a subvolume sharing data

df is misleading on btrfs. Use btrfs filesystem usage, which shows allocated and unallocated space per profile.

Most commands need root and take a path inside the mounted filesystem, not the device.

INSPECT

btrfs filesystem show
List filesystems and their devices

btrfs filesystem usage *<path>*
Show allocated, free and unallocated space

btrfs filesystem df *<path>*
Show space per chunk type

INSPECT (cont.)

btrfs filesystem usage -T *<path>*
Show usage as a table

btrfs device usage *<path>*
Show allocation per device

btrfs filesystem du -s *<path>*
Show exclusive and shared size

btrfs filesystem label *<path>*
Show the filesystem label

btrfs device stats *<path>*
Show per-device IO error counters

SUBVOLUMES

btrfs subvolume create *<path>*
Create a subvolume

btrfs subvolume list *<path>*
List subvolumes

btrfs subvolume delete *<path>*
Delete a subvolume

btrfs subvolume list -t *<path>*
List subvolumes as a table

btrfs subvolume list -s *<path>*
List snapshots only

SUBVOLUMES (cont.)

btrfs subvolume list -o *<path>*
List subvolumes directly below a path

btrfs subvolume show *<path>*
Show UUID, generation and flags

SNAPSHOTS

btrfs subvolume snapshot *<src>* *<dst>*
Snapshot a subvolume (read-write)

btrfs subvolume snapshot -r *<src>* *<dst>*
Snapshot a subvolume read-only

btrfs property get -ts *<path>* **ro**
Check the read-only flag

btrfs property set -ts *<path>* **ro false**
Make a snapshot writable

SEND AND RECEIVE

btrfs send *<snap>* **| btrfs receive** *<dir>*
Copy a read-only snapshot

btrfs send -p *<parent>* *<snap>* **| btrfs receive** *<dir>*
Send only the changes since a parent

SEND AND RECEIVE (cont.)

btrfs send -f *<file>* *<snap>*
Write a send stream to a file

btrfs receive -f *<file>* *<dir>*
Read a send stream from a file

Only read-only subvolumes can be sent. An incremental send needs the same parent snapshot present on both sides.

SCRUB AND BALANCE

btrfs scrub start *<path>*
Verify checksums in the background

btrfs scrub status *<path>*
Show scrub progress and errors

btrfs balance start -dusage=50 *<path>*
Compact data chunks under 50% full

btrfs balance start -dusage=0 *<path>*
Free completely empty data chunks

btrfs balance status *<path>*
Show balance progress

SCRUB AND BALANCE (cont.)

btrfs balance start -dconvert=raid1 -mconvert=raid1 *<path>*
Convert to another RAID profile

DEVICES AND MAINTENANCE

btrfs device add *<dev>* *<path>*
Add a device to a mounted filesystem

btrfs device remove *<dev>* *<path>*
Remove a device, moving its data off

btrfs replace start *<old>* *<new>* *<path>*
Replace a device while mounted

btrfs filesystem resize max *<path>*
Grow to fill the device

REPAIR

btrfs check *<dev>*
Check an unmounted filesystem (read-only)

Try scrub, a read-only mount (-o ro,rescue=all) and btrfs restore before any check --repair.