Introduction to btrfs

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Butter? B-Tree? Better?

/shrug

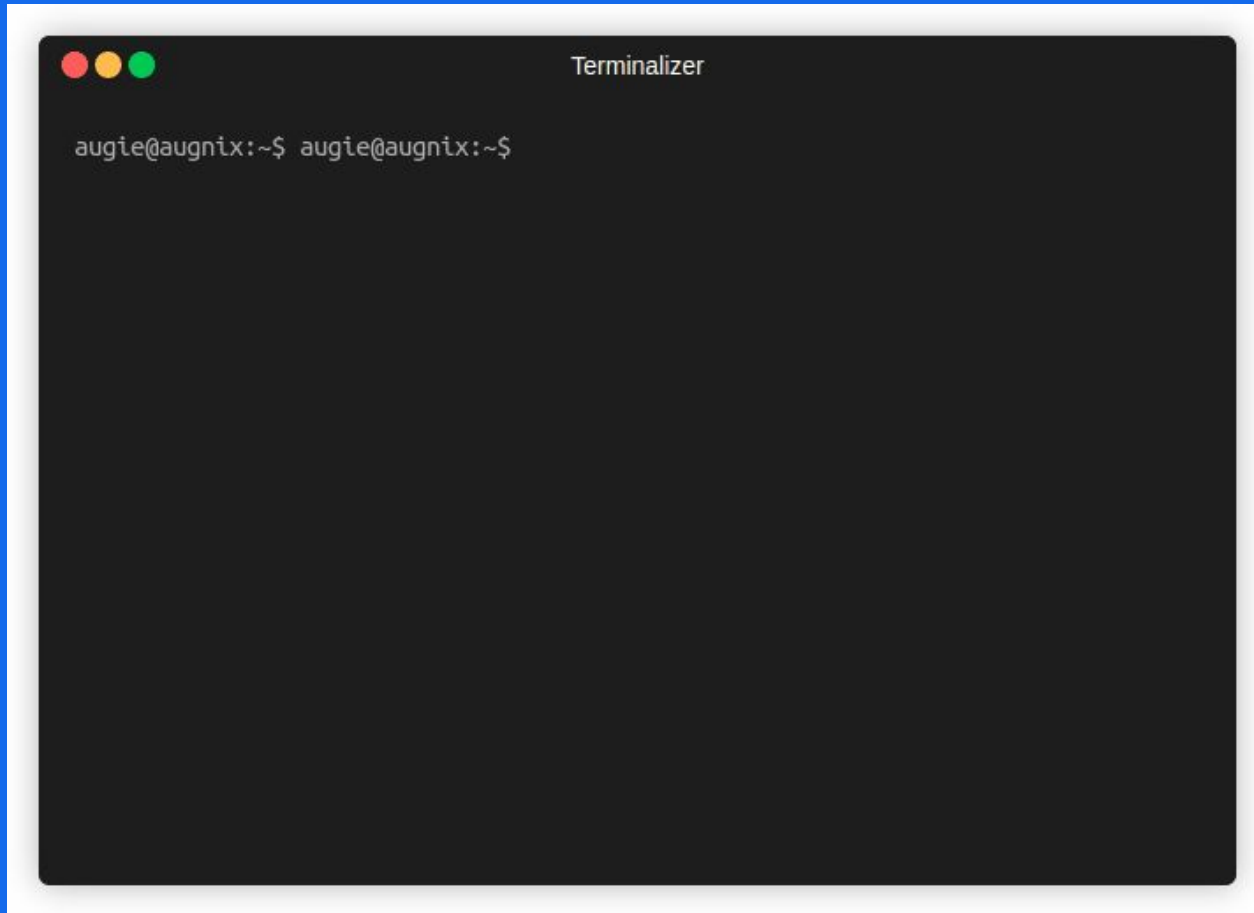Btrfs is a Linux file system

Why btrfs?

- Copy-on-Write (CoW)
- Dynamic inode allocation
- Online defragmentation, resizing
- Built-in RAID

- Built-in compression
  - Ztd, lzo, zlib
- Checksums

Snapshots

Snapshots are just subvolumes, cd into, write to them, mount, make read-only, diff, send/receive, etc.

Snapshots are not backups.

```
→   ~ tree -L 1 -d /home/.snapshots
/home/.snapshots
├── home.20250330T0917
├── home.20250406T0917
├── home.20250413T1017
├── home.20250414T0717
├── home.20250415T0717
├── home.20250416T0747
├── home.20250416T0917
├── home.20250416T1017
├── home.20250416T1117
├── home.20250416T1200
├── home.20250416T1317
├── home.20250416T1417
├── home.20250416T1517
└── home.20250416T1605
```

Subvolumes

/   /usr/local

/opt   /var

/root   /home

/swap   /tmp

Send/receive

btrfs send /home/augie/.snapshots/home-1 | btrfs receive /mnt/backup

Compression

ZLIB: slower, higher compression ratio.

LZO: faster compression and decompression than ZLIB, worse compression ratio, designed to be fast.

ZSTD: compression comparable to ZLIB with higher compression/decompression speeds and different ratio

Real world use cases

- Simple snapshot based backups
- Snapshot before apt installs

- Incremental snapshots offsite
- Lots of compressible files

Practical considerations

RAID 5 or 6

Mostly OK - safe for general use, there are some known problems that do not affect majority of users

Some standard tools won't work

Df and du and make sure you exclude .snapshots from updatedb

Run btrfsmaintenance regularly

This will include some tasks you should run monthly or weekly.

Useful tools

btrbk - handy backup tool and abstraction for taking snapshots

httm - useful for finding files, or performing diffs between snapshots

btrfsmaintenance - automates maintenance tasks

compsize - reports effective compression ratio

Questions?

About me

Engineering leader, Infrastructure, startups for the last six years, almost the whole alphabet in funding rounds.

Looking to join a team again.

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