Poorly Planned Filesystem Adventures

Danny Robson

Caveats

- Take backups.
- Make and test a usable live USB.
- Check everything twice.

Caveats

Don’t

Context

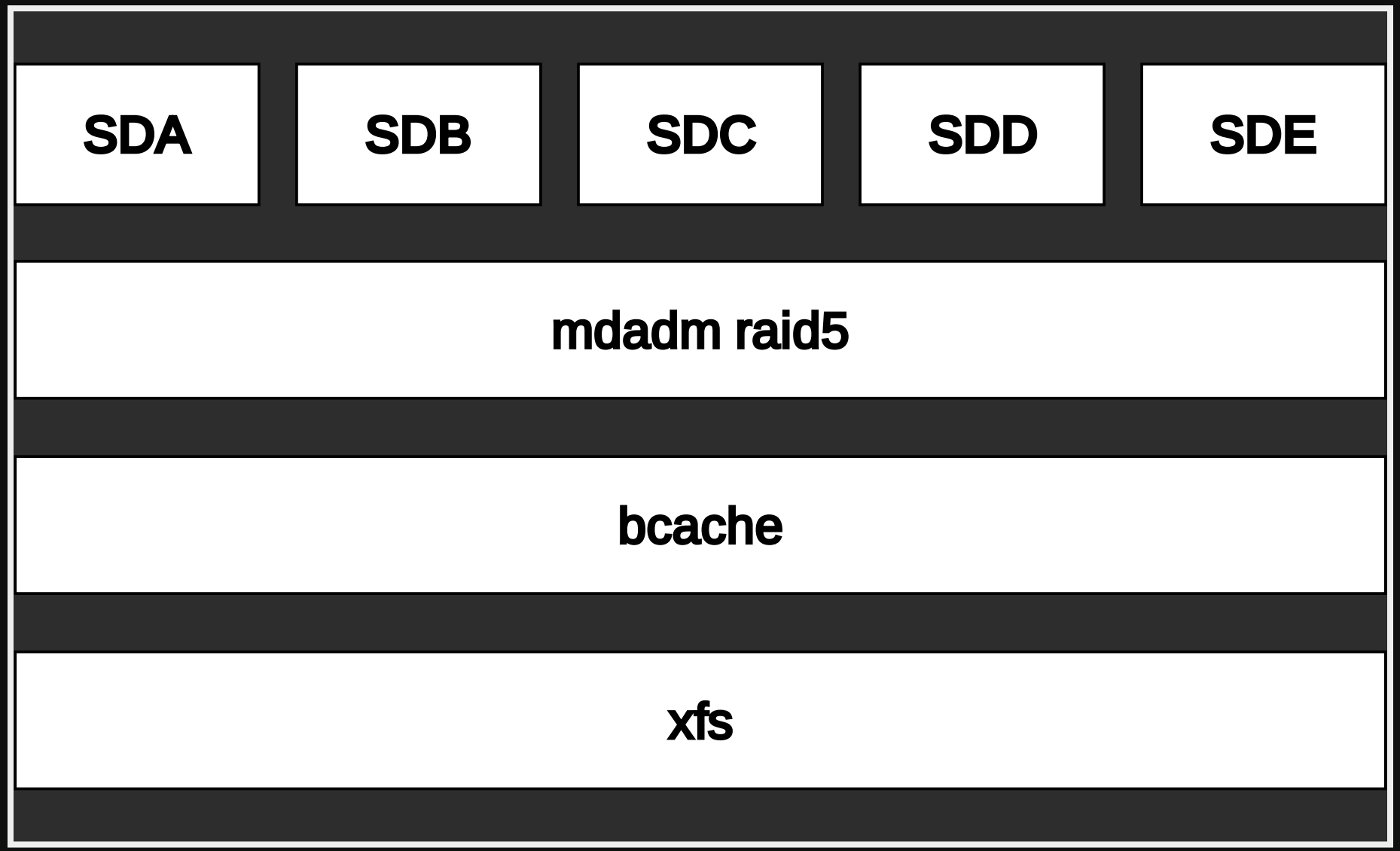
- 5x1TB HDD
- 1x256G NVME
- 1x256G SSD

Context

- 1TB photos
- 150G src + build
- 50G Postgres

Somewhat complicated

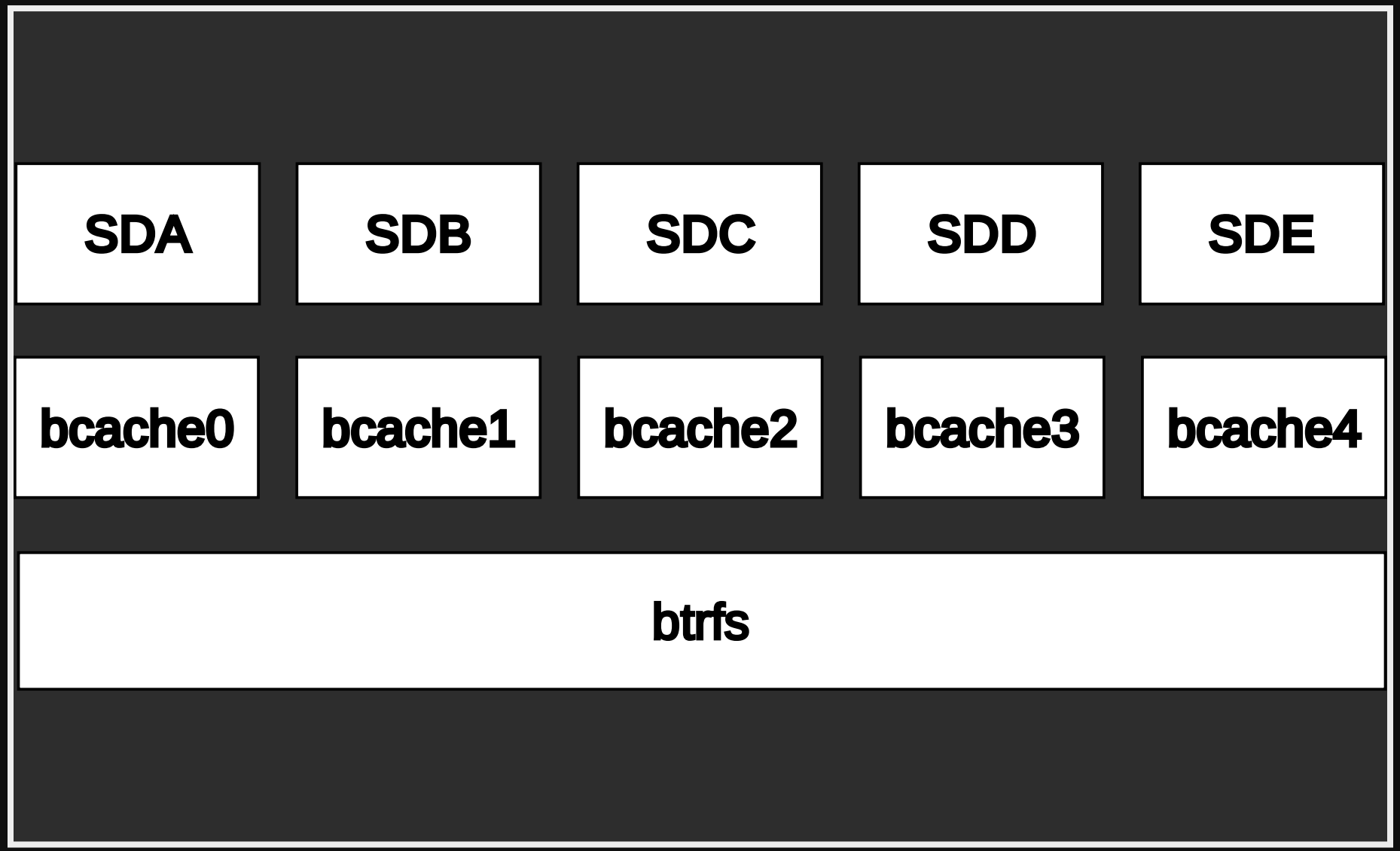
Layout



Problems

- *Some* poor random-IO
- Poor RAID flexibility
- Potentially inconsistent backups

Idea


SDA
SDB
SDC
SDD
SDE
bcache0
bcache1
bcache2
bcache3
bcache4
btrfs

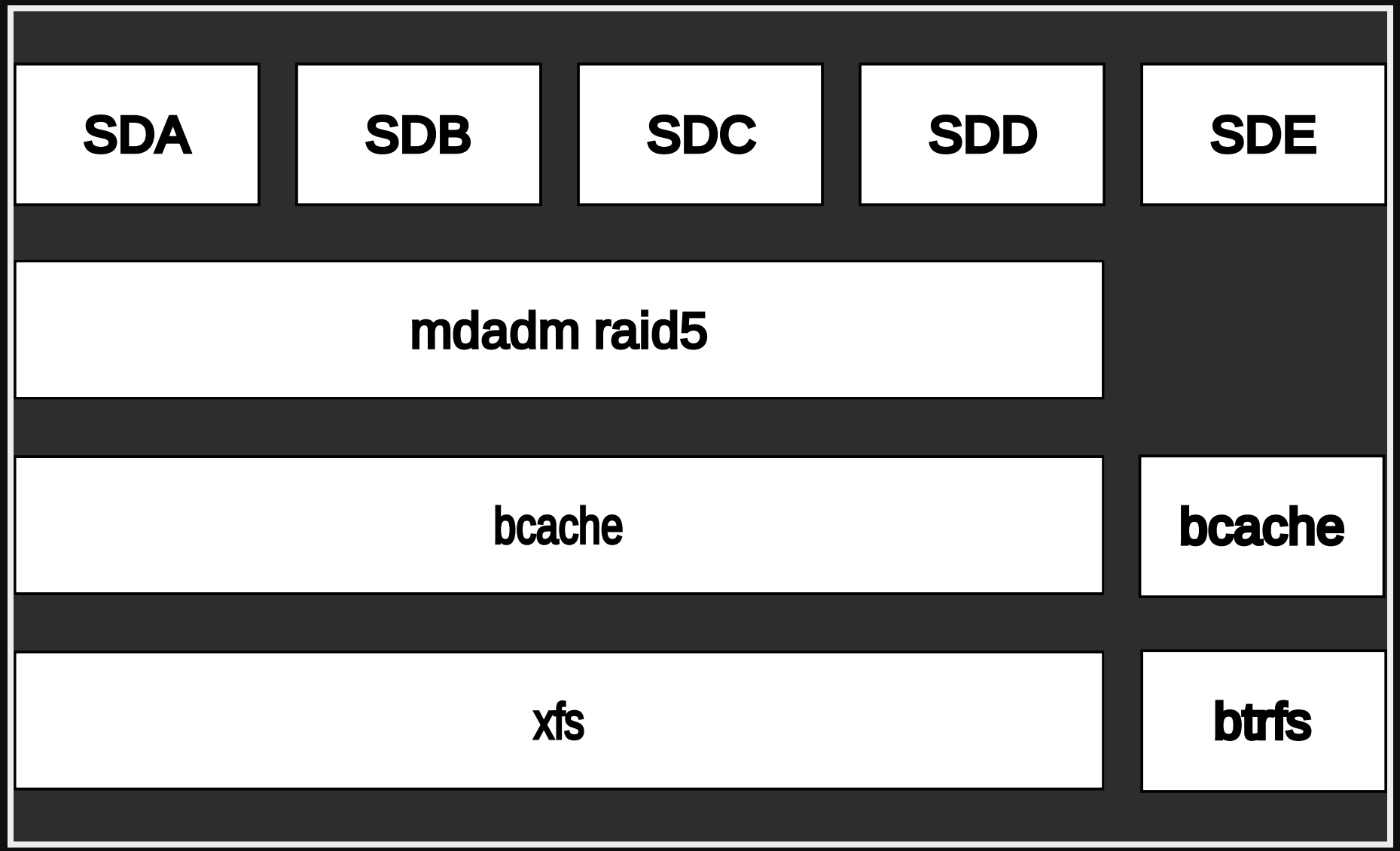
Constraints

Don’t backup and restore.

Idea

1. Shrink FS by one drive
2. Remove drive from mdadm
3. Add drive to BTRFS
4. Move data
5. Repeat

Idea



Complication

XFS can’t shrink.

`fstransform`

Converts a block device between filesystems while preserving the contents.

Supports: ext2, ext3, ext4, jfs, reiserfs, xfs

fstransform

##

DISCLAIMER

THIS DOCUMENT EXPLAINS HOW TO USE

RISKY PROGRAMS AND PROCEDURES

THAT MAY COMPLETELY AND IRREVERSIBLY DELETE

ALL THE DATA ON YOUR DISKS

THE AUTHOR DECLINES ALL RESPONSIBILITIES

FOR ANY DAMAGE THAT MAY DERIVE

FROM USING THE PROGRAMS AND PROCEDURES

DESCRIBED IN THIS DOCUMENT

##

Idea

1. fstransform XFS to EXT4
2. Shrink EXT4

Implementation

```
fstransform ${FS} ext4
```

Implementation

Wait 24 hours.

Resize

```
e2fsk $FS
resize2f $FS $SIZE
```

Reshape

```
mdadm --manage $MD --grow \
    --array-size $SIZE
mdadm --manage $MD --grow \
    --raid-devices=$COUNT \
    --backup-file=$USB
```

Implementation

Wait 8 hours.

BTRFS

Like ZFS.

But without the performance or reliability.

Though has reshape flexibility.

Create

```
mkfs.btrfs ${DEV1}       \
    --data=single        \
    --metadata=dup       \
    --csum=blake2        \
    -o raid56,raid1c34
```

RAID5

Probably safe if you don’t have a hard crash immediately followed by a disk failure…?

RAID5

```
btrfs device add $DEVICE $MOUNT
btrfs balance start -dconvert=raid1c3 -mconvert=raid1c3 $MOUNT
```

RAID5

Except, I entered a wrong filesystem size earlier and nuked my system.

Conclusion

Backups are important.

Thanks

Notes

- Don’t use bare drives. It’ll confuse you later on.