



**OST**

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# Distributed Systems & Blockchain (DS1)

**In the news**

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# Distributed Systems & Blockchain in the News

- 25.02.2021: Google admits Kubernetes container tech is so complex, it's had to roll out an Autopilot feature to do it all for you
  - “Google has recognised that users struggle to configure Kubernetes correctly”
  - How to reduce complexity: ~~introduce another layer of abstraction~~
  - Many options preconfigured
    - E.g. no SSH access
  - Additional \$0.10 per hour charged for autopilot



<https://en.wikipedia.org/wiki/Kubernetes>

# Distributed Systems & Blockchain in the News

- 17.02.2021: M1 Mac owners are experiencing extremely high SSD writes over short periods of time, likely thanks to aggressive swap
- 24.02.2021: Nein, die SSDs von M1-Macs gehen nicht schneller kaputt
  - Flash memory have a limited lifetime. They can only handle around 1k-100k writes.
    - SLC: 1bit ~ 100'000 write cycles
    - MLC: 2 bits ~ up to 3'000 write cycles
    - TLC: 3 bits ~ 1'000 cycles
    - QLC: 4 bits (16 states) ~ 1'000? write cycles
    - PLC: 5 bits (research)
  - Consumer, server SSD (example / example)
  - Wear Leveling: dynamic (move data on each write) and static (periodically move read-only data)

- My machine (no swap, lots of RAM, TLC)

```
Supported LBA Sizes (NSID 0x1)
Id Fmt Data Metadt Rel_Perf
0 + 512 0 0

=== START OF SMART DATA SECTION ===
SMART overall-health self-assessment test result: PASSED

SMART/Health Information (NVMe Log 0x02)
Critical Warning: 0x00
Temperature: 48 Celsius
Available Spare: 100%
Available Spare Threshold: 10%
Percentage Used: 1%
Data Units Read: 16,165,231 [8.27 TB]
Data Units Written: 82,521,697 [42.2 TB]
Host Read Commands: 602,129,184
Host Write Commands: 1,140,378,074
Controller Busy Time: 1,508
Power Cycles: 181
Power On Hours: 1,091
Unsafe Shutdowns: 74
Media and Data Integrity Errors: 0
Error Information Log Entries: 261
Warning Comp. Temperature Time: 0
Critical Comp. Temperature Time: 0
Temperature Sensor 1: 48 Celsius
Temperature Sensor 2: 51 Celsius
```

- Lifetime of my SSD

$$\text{Expected lifetime} = \frac{\text{Size of NAND flash} \times \text{number of erase cycles} \times \text{FAT overhead}}{\text{bytes written per day}}$$

- 2TB x 1000 / 5 \* 42.2TB ~ 9.4 years