Impact of Zstd

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All Systems Go! 2019! Berlin!

Zstandard (zstd)

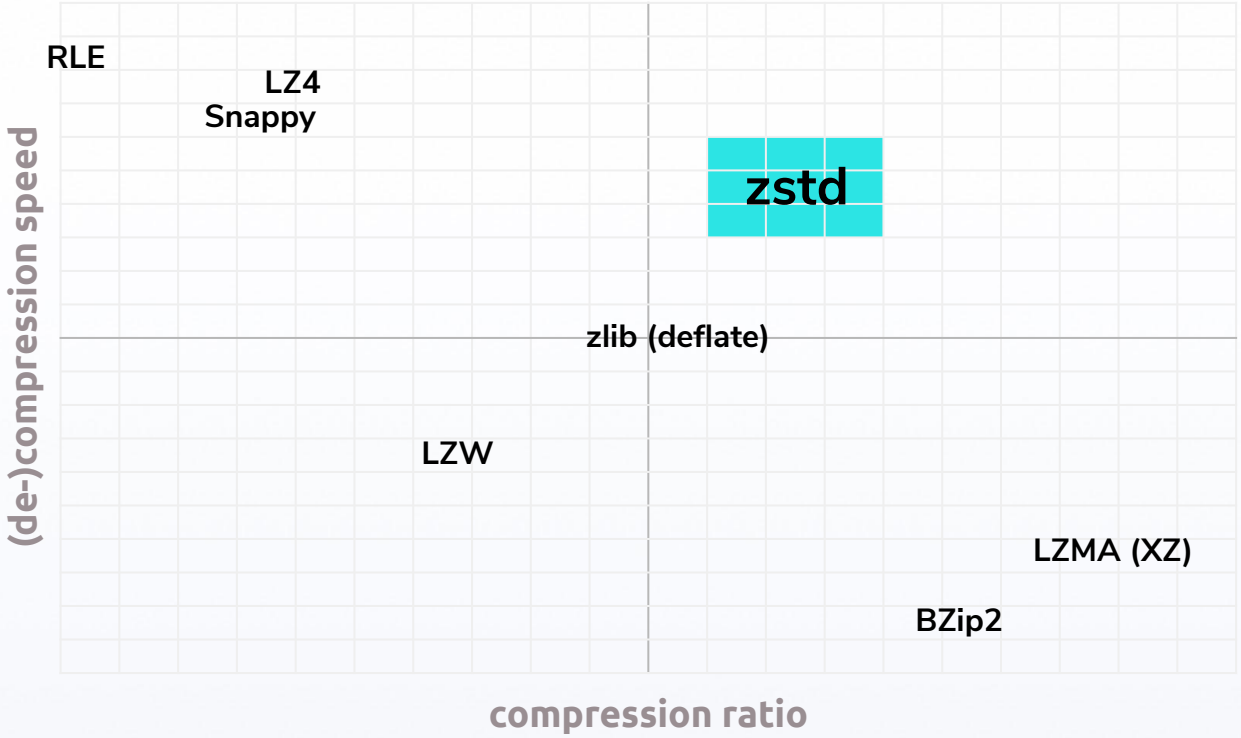
- Lossless data compression algorithm
- Developed by Yann Collet @ Facebook
- Released in 2016
- Based on LZ like almost every other codec
- Kind of a big deal

Yann Collet

- Data compression expert working at Facebook
- LZ4
- Zstd
- xxHash - http://www.xxhash.com/
- RealTime Data Compression blog
  http://fastcompression.blogspot.com/
- Made a big difference in the industry - Thanks, Yann!

Compression algorithms

Lossless compression



Lossy compression

High quality

...low quality

(images from Wikipedia)

Efficiency: size and speed
(compression / decompression)
(on my laptop)

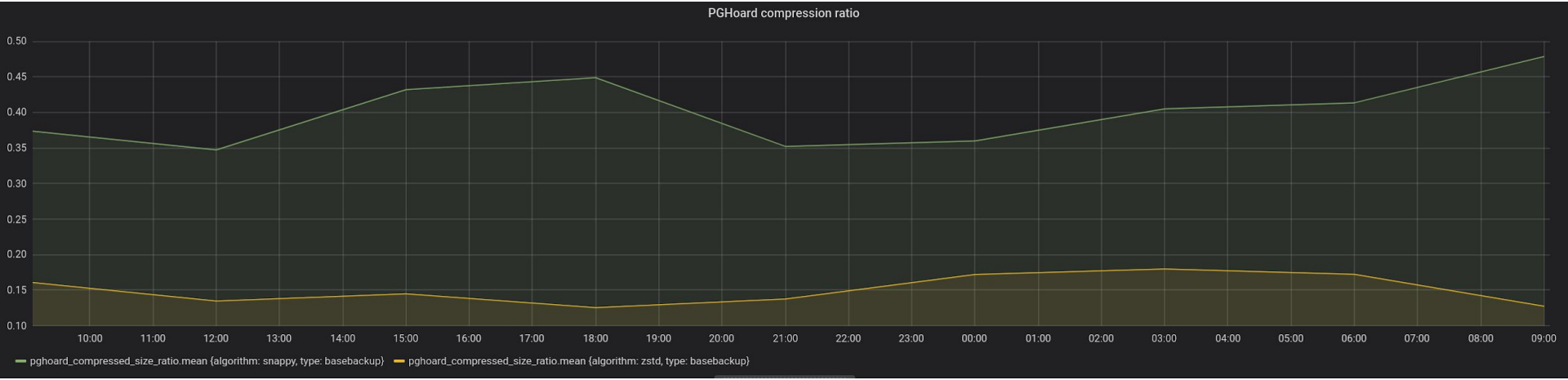
1600MB NULL (100 PG WAL segments)

- Zstd: **0.1MB** / 1.5sec / 1.0sec
- Gzip: 1.6MB / 8.9sec / 6.4sec
- LZ4: 6.6MB / 0.7sec / 1.1sec

211MB tarball of systemd

- Zstd: 166MB / 0.7sec / 0.25sec
- Gzip: 168MB / 6.5sec / 1.30sec
- LZ4: 174MB / 0.3sec / 0.19sec

Impact of Zstd at Aiven



- Compression of our PostgreSQL basebackups
- Compressed size for snappy is about 0.4 of the original
- Compressed size for Zstd is about 0.15

Adoption

Zstd is “pretty good” for almost all use cases, and used in e.g.:

- RocksDB (2016)
- Linux kernel (2017)
- HTTP (2018, RFC8478)
- Kafka (2018, version 2.1)
- RPM (2019, Fedora 31)
- PGHoard (2019)

Gotchas

Adoption: Make sure users can handle data compressed in a new format

Kafka: 1st upgrade consumers (all of them), then brokers, finally producers

Package manager: zstd support available in a package compressed by.. zstd?

Naive applications: Are you sure you have enough disk/memory to decompress it?

With LZ4 you never ran out of memory decompressing a 50MB blob

(happened to us)

Aiven

- Open source data technologies (Kafka, DBs) as managed services in public clouds
- Offices in Helsinki, **Berlin**, Boston and Sydney
- Now using Zstd for transport & storage compression in various places
- **Thanks for listening, meet us at the lounge!** (we're hiring)
- https://aiven.io