ZSTD/ZLIB single-directional compression resource usage comparison

with decompressor max window size limit

Benchmark config

pgbench host specs
64 CPU cores / 504 GB RAM / 1.2 TB SSD storage
database setup
pgbench "host=xxx dbname=xxx port=5432 user=xxx" -i -s 500
sample test run
pgbench "host=xxx dbname=xxx port=5432 user=xxx compression=zstd:(1/3/5/7/9/11/13/15/17/19)" --builtin tpcb-like -t 50 --jobs=64 --client=700

ZSTD decompressor max windowLog size = 23
ZSTD decompressor windowBase = 8 MB

Postgresql host specs
20 CPU cores / 157 GB RAM / 700 GB SSD storage
Postgresql additional config
max_connections = 2000
shared_buffers = 40GB
effective_cache_size = 120GB
maintenance_work_mem = 2GB
checkpoint_completion_target = 0.7
wal_buffers = 16MB
default_statistics_target = 100
random_page_cost = 1.1
effective_io_concurrency = 200
work_mem = 5242kB
min_wal_size = 1GB
max_wal_size = 4GB
max_worker_processes = 20
max_parallel_workers_per_gather = 4
max_parallel_workers = 20
max_parallel_maintenance_workers = 4

Benchmark details

Database host resource usage

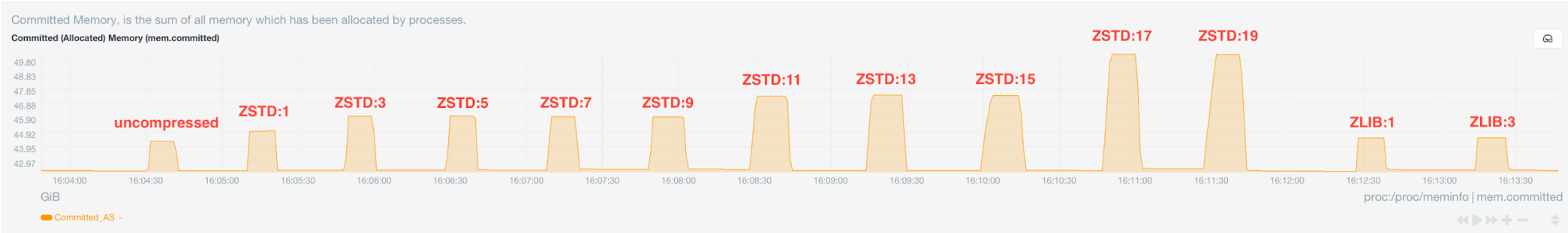
Committed (Allocated) Memory baseline: 42.4 GiB

Mode	apps.mem (sql), GiB	Total Committed (Allocated) Memory (Committed_AS), GiB	Committed (Allocated) Memory (Committed_AS) above baseline, GiB	Committed (Allocated) Memory (Committed_AS) above baseline, %
Without compression	1.25	44,36	1,05	4,62
ZSTD:1	1.30	45,03	1,06	6,20
ZSTD:3	1.28	46,05	1,09	8,61
ZSTD:5	1.28	46,06	1,09	8,63
ZSTD:7	1.28	46,02	1,09	8,54
ZSTD:9	1.28	46,00	1,08	8,49
ZSTD:11	1.28	47,39	1,12	11,77
ZSTD:13	1.29	47,46	1,12	11,93
ZSTD:15	1.28	47,43	1,12	11,86
ZSTD:17	1.28	50,23	1,18	18,47
ZSTD:19	1.28	50,21	1,18	18,42
ZLIB:1	1.33	44,57	1,05	5,12
ZLIB:3	1.33	44,57	1,05	5,12

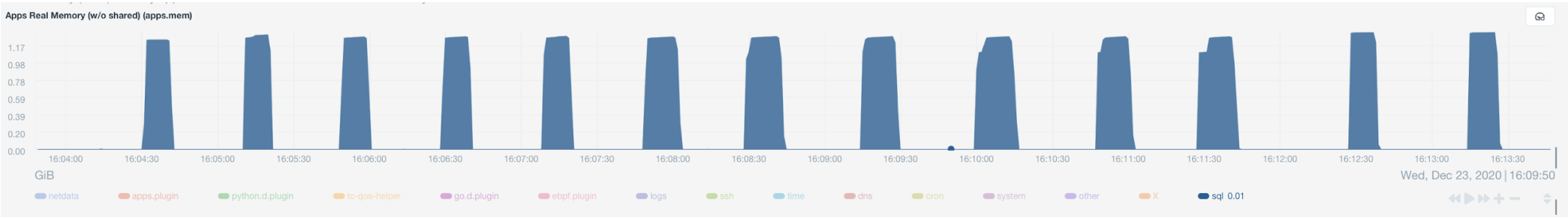
Resource consumption graphs

Memory

Committed (Allocated) Memory (mem.committed)

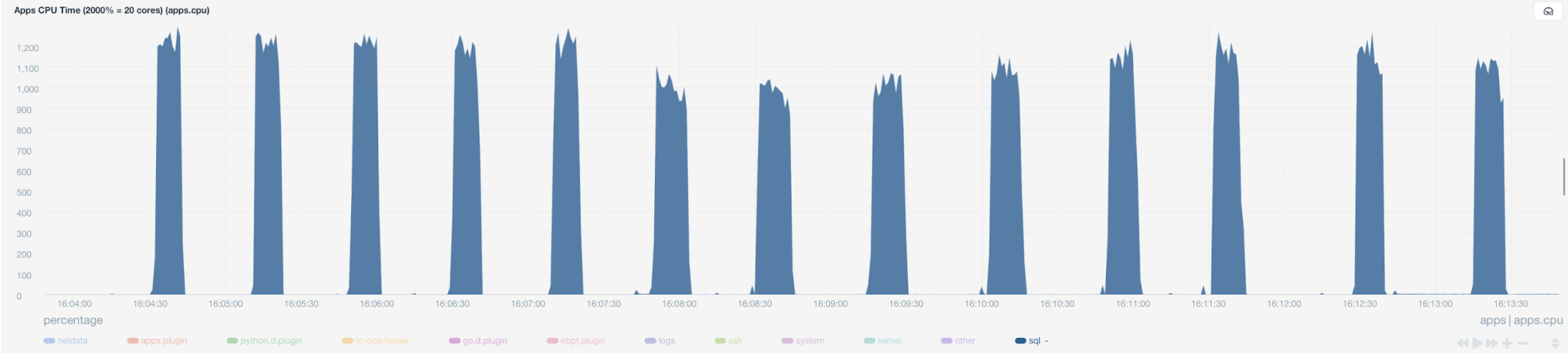


Apps Real Memory (w/o shared) (apps.mem)



Network

Bandwidth (net.eth0)

CPU

Apps CPU Time (2000% = 20 cores) (apps.cpu)