PostgreSQL Configuration Tuning CheatSheet

github.com/vaibhav90/PostgreSQL-Parameter-Tuning-CheatSheet

Autovacuum

autovacuum_vacuum_threshold (50)
Min. # of tuple updates/deletes prior to vacuum
Table with > 1M rows, set to 1% # rows

autovacuum_vacuum_scale_factor (0.2)
# of tuple updates or deletes prior to vacuum
Set it to 0, keep the configuration simple

autovacuum_vacuum_cost_delay (2ms)
Vacuum cost delay in milliseconds
Set inversely proportional to I/O frequency

autovacuum_vacuum_cost_limit (-1)
Vacuum cost amt. available before napping
Set 1000 to increase throughput by 5x

autovacuum_analyze_threshold (50)
Min # of tuple trans. prior to analyze
Proportional to # of autovac workers

autovacuum_work_mem (-1)
Max memory used by each worker process
Proportional to # of autovac workers

autovacuum_max_workers (3)
Max # of autovacuum worker processes
Between 0-3

Write-Ahead Log

max_wal_size (1GB)
WAL size that triggers a checkpoint
When writing > 1GB/per, set to 20GB

min_wal_size (80MB)
Min. size to shrink the WAL
Atleast 1GB in high write workload env

checkpoint_timeout (5min)
Max time btw auto WAL checkpoints
Set it to duration of ETL run

checkpoint_completion_target (0.5)
Time spent flushing dirty buffers
0.9 to evenly distribute flushing

Asynchronous Behavior

effective_io_concurrency (1)
simultaneous requests handled by the disk
disks in RAID array

max_worker_processes (8)
Max # of concurrent worker processes
max_parallel_workers + other workers

max_parallel_workers (8)
Max. # parallel workers that can be active
Alter based on # parallel queries

max_parallel_workers_per_gather (2)
max # of parallel processes/executor node
# of cores/concurrent sessions

Kernel Settings

vm.swappiness (60)
How aggressive kernel perfs men page swaps
1 - do not swap inactive RAM pages

vm.overcommit_memory (0)
Assign more men to devices then actual limit
2 - disable process memory overcommit

dirty_ratio (40)
Max # of dirty pages before writing dirty buffers
Set it to 15% of RAM availability

dirty_backgroud_ratio (20)
Min. % of RAM to occupy dirty pages before flush
20% of RAM availability

Reporting & Logging

logging_collector (off)
Capture stderr output to log files
Switch on for csvlog and stderr

log_min_duration_statement (-1)
Min exec time to start logging statements
Set to 0 to log everything

log_destination [stderr]
Sets the destination for server log output
csvlog (to pipe it to pgbadger)

log_directory (log)
Sets the destination directory for log files
Keep separate from db & transaction log

log_filename [%Y-%m-%d_%H%M%S.log]
Sets the file name pattern for log files
For auto log rotation, set weekdays/months

log_rotation_size (10MB)
Auto log rotation occurs after N kilobytes
100MB - avoid creation of further log segments

log_line_prefix (%m)
printf-style string to begin each log line
"%h:%d:%u:%c %t"

Memory

work_mem (4MB)
Max. memory to be used for query workspace
(max_connections)*[0.5% * RAM Size]

effective_cache_size (4GB)
Tells query planner of RAM availability
25% of RAM availability (not allocated physically)

shared_buffer (8MB)
Exclusively dedicated to postgres for caching
50% of RAM availability

maintenance_work_mem [64MB]
Memory for maintenance operations
4% of RAM availability

wal_buffers (8kB)
disk page buffers in shared memory
On a busy, high-core machine set to 128MB