MySQL 5.1 Configuration Files & Options
Part I

Presented by: Sheeri K. Cabral
Twitter: @sheeri
About Pythian

• Recognized Leader:
  • Global industry-leader in database infrastructure services for Oracle, Oracle Applications, MySQL and SQL Server
  • 150 current multinational companies such as Forbes.com, Fox Sports and Western Union to help manage their complex IT deployments

• Expertise:
  • One of the world’s largest concentrations of dedicated, full-time DBA expertise.

• Global Reach & Scalability:
  • 24/7/365 global remote support for DBA and consulting, systems administration, special projects or emergency response
What you can use this info for

- Files, purpose, known issues
- System and status variables
- Tuning
- Includes Percona variables
Included/not included

- Up to MySQL 5.1.41
- Includes Percona variables (5.1.36)
- Does not include InnoDB plugin variables
Directories

- basedir
  - /app/mysql-5.1.29-rc-linux-x86_64/
- datadir
  - /app/mysql/data
- tmpdir
  - /tmp
Directories

- language
  - /app/mysql-5.1.29-rc-linux-x86_64/share/mysql/english/
- plugin_dir
  - /app/mysql-5.1.29-rc-linux-x86_64/lib/mysql/plugin
Configuration Files

• In order:
  • /etc/my.cnf
  • /etc/mysql/my.cnf
  • $SYSCONFDIR/my.cnf
    – (--sysconfdir option to compiling)
Configuration Files (2)

• In order (still):
  • $MYSQL_HOME/my.cnf
    – Server options [mysqld] [safe_mysqld] directives
  • --defaults-extra-file
  • ~/.my.cnf
    – User options [client] directive
  • commandline
Summary: Configuration Files

- Just use /etc/my.cnf or /etc/mysql/my.cnf
- and optionally ~/.my.cnf if you want to store passwords, but secure the file!
Other Files

- File extensions used by MySQL
  - .index .MYI .MYD .TRG .TRN .ibd .info .frm
- db.opt
- Slave information
  - master.info
  - relay-log.info
- Recommend: turn on log-slave-updates on all machines
Version

- Version (5.1.37-1ubuntu5-log)
  - version_comment (Ubuntu)
  - version_compile_machine (x86_64)
  - version_compile_os (debian-linux-gnu)
- License (GPL)
Basics

- `div_precision_increment (4)`
  - Default precision value
  - 4, so $\frac{1}{11}=0.0909$

- `lower_case_table_names (1)`
- `lower_case_file_system (OFF)`
Basics

- hostname (sea1tpmysql03s1)
- port (3306)
- socket (/tmp/mysql.sock)
- pid file (/app/mysql/data/sea1tpmysql03s1.pid)
- protocol version (10)
  - client/server mysql protocol
Basics

- storage_engine (InnoDB)
  - also table_type
- time_zone (SYSTEM)
- system_time_zone (PDT)
- timestamp (124101315)
  - used mostly in replication
  - affects CURRENT_TIMESTAMP(), NOW()
  - only affects SYSDATE() if sysdate-is-now is set
Basics

- Queries
- Questions
- Uptime
- Uptime_since_flush_status
Connections

- max_connections (5000)
  - Max_used_connections (50)

- Threads_connected (33)
  - Threads_running (2)
Threads

- Connections (439049)
- Threads_created (50)
- Threads_cached (17)
  - thread_cache_size (48)
When a thread is slow to launch

- slow_launch_time (2)
- Slow_launch_threads (0)
Aborted connects/clients

- Aborted_clients (9)
- Aborted_connects (57932)
  - max_connect_errors (100)
  - FLUSH HOSTS
  - connect_timeout
Per-user limits

- `max_tmp_tables` (32)
  - not used yet

- `max_user_connections` (0)
Security

- old_passwords (OFF)
- secure_auth (ON)
- skip_show_database (OFF)
- secure_file_priv
Initial SQL

- `init_connect`
  - String to execute when cxn is made

- `init_file`
  - File to execute when cxn is made

- `init_slave`
  - String to execute when slave cxn is made
Query Cache

- `query_cache_type` (ON)
  - `have_query_cache` (YES)

- `query_cache_size` (128M)
  - `Qcache_total_blocks` (64,428)
  - `Qcache_free_blocks` (15,348)
  - `Qcache_free_memory` (44.1M)

- `Qcache_queries_in_cache` (20,536)
Query Cache Usage

- `query_cache_limit` (4M)
- `Qcache_not_cached` (14,000,166)

- `Qcache_lowmem_prunes` (18,290,939)
  - Defragment with FLUSH QUERY CACHE
  - `query_cache_min_res_unit` (4096) can be decreased if results are very small
Query Cache Usage

- Qcache_hits (15,399,458)
- Qcache Inserts (26,947,349)
- Com_select (40,947,868)
  - Query cache hit % = 39.69%
Query Cache Other

- query_cache_wlock_invalidate (OFF)
Errors/Warnings

- error_count (0)
- warning_count (0)
- max_error_count (64)
Character sets

- character_sets_dir
  - /app/mysql-5.1.29-rc-linux-x86_64/share/mysql/charsets

- character_set_
  - client (utf8)
  - results (utf8)
  - server (utf8)
  - database (utf8)
  - filesystem(binary)
  - system (utf8)
  - connection (utf8)
Collations

• collation_
  • server (utf8_general_ci)
  • database (utf8_general_ci)
  • connection (utf8_general_ci)
Locale information

- default_week_format (0)
- lc_time_names (en_US)
Logs

- log_output (FILE,TABLE)
- General
- Slow query
- Error
- Binary
General Log

- `general_log` (OFF)
  - `log` (OFF)

- `general_log_file` (/app/mysql/data/sea1tpmysql03s1.log)

- `sql_log_off` (OFF)
Slow Query Log

- slow_query_log (ON)
  - log_slow_queries (ON)
- slow_query_log_file (/app/mysql/data/sea1tpmysql03s1-slow.log)
- Slow_queries (649)
What gets logged as a slow query

- long_query_time (0.5)
- log_queries_not_using_indexes (OFF)
- min_examined_row_limit (0)
Error Logging

- `log_error` (/app/mysql/data/sea1tpmysql03s1.err)
- `log_warnings` (1)
  - `sql_notes` (ON)
Binary Logging

- log_bin (ON)
  - sql_log_bin (ON), sql_log_update (ON)

- max_binlog_size (1G)
- binlog_format (MIXED)
  - mysqlbinlog --base64-output=DECODE-ROWS

- expire_logs_days (7)
Binary Log Cache

- binlog_cache_size (2M)
- Binlog_cache_use (3,924,856)
- Binlog_cache_disk_use (23)
Replication and Binary Logging

- server_id (1)
- log_slave_updates (ON)
- sync_binlog (1)
- sync_frm (ON)
Determinism and Replication

- insert_id (0)
- last_insert_id (0)
- identity (0)
- rand_seed1, rand_seed2
Slave Registration

- Optional, used for SHOW SLAVE HOSTS
  - report_host
  - report_port (3306)
  - report_user
  - report_password
Relay Logs

- `relay_log`, `relay_log_index`

- `relay_log_info_file` (`relay_log.info`)

- `max_relay_log_size` (0)
  - `relay_log_space_limit` (0)
  - `relay_log_purge` (ON)
Master/Master Replication Settings

- `auto_increment_offset` (1)

- `auto_increment_increment` (1)
Slave Settings

- slave_skip_errors (1061,1062)
- slave_net_timeout (60)
- slave_transaction_retries (10)
More Slave Settings

- `slave_exec_mode` (STRICT)
- `slave_load_tmpdir` (/tmp)
- `slave_compressed_protocol` (OFF)
Slave Status Variables

- Slave_open_temp_tables (0)
- Slave_retried_transactions (0)
- Slave_running (ON)
Slave Session Variables

- `sql_slave_skip_counter (0)`
- `sql_warnings (OFF)`
Do and Ignore

- binlog-do-db – don't use
- binlog-ignore-db – don't use
- replicate-do-db – don't use
- replicate-ignore-db – don't use
- replicate-do-table – don't use
- replicate-ignore-table
- replicate-ignore-wild-table
Remember

- init_slave
Other Binary Log Variables

- `max_binlog_cache_size`
  - max is supposed to be 4G
  - Appears as >17,000,000,000 G
  - bug, fixed by 5.1.31
Stored Routines

- max_sp_recursion_depth (0)
- automatic_sp_privileges (ON)
- log_bin_trust_functionCreators (OFF)
- log_bin_trust_routineCreators (OFF)
Temporary Tables

- Per-thread
  - `tmp_table_size` (128M)
  - `max_heap_table_size` (128M)

- `Created_tmp_tables` (2,017,444)
- `Created_tmp_disk_tables` (13,746)
Memory Settings
(not storage engine dependent)

- `join_buffer_size` (128k)
- `read_rnd_buffer_size` (28M)
- `max_prepared_stmt_count` (16382)
- `preload_buffer_size` (32768)
Memory Settings
(not storage engine dependent)

- `query_alloc_block_size` (8192)
- `query_prealloc_size` (8192)
- `thread_stack` (192k)
Table Definition Cache

- `table_definition_cache (256)`
- `Open_table_definitions (181)`
- `Opened_table_definitions (465)`
Sorting Variables

• Sort_range (2,105,552)

• Sort_rows (12,161,270)

• Sort_scan (1,539,997)
Bad Handler Status

- Handler_read_first (1704010)
- Handler_read_rnd (1354665)
  - read_buffer_size (2M)
- Handler_read_rnd_next (2637167797)
Good Handler Status

- `Handler_read_key` (177,713,296)
- `Handler_read_next` (235,042,485)
- `Handler_read_prev` (0)
Sorting System Variables

- `sort_buffer_size` (56M)
  - `Sort_merge_passes` (0)
- `max_sort_length` (1024)
Join Buffer

• join_buffer_size (56M)

• Select_full_join (1)

• Select_scan (2888498)
Joining

- `max_join_size (4,294,967,295)`
  - `sql_max_join_size`
- `sql_big_selects (ON)`
- `Select_range_check (0)`
Join Status Variables

- Select_full_range_join (0)
- Select_range (808,772)
Profiling

- `have_community_features` (YES)

- profiling (OFF)
  - per-session

- `profiling_history_size` (15)
Optimizer

- optimizer_prune_level (1)
- optimizer_search_depth (62)
- optimizer_switch (5.1.34)
Optimization

- $\text{max\_seeks\_for\_key} \ (1.84\times10^{19})$
- $\text{max\_length\_for\_sort\_data} \ (1024)$
- $\text{Last\_query\_cost} \ (0)$
Optimization

- `range_alloc_block_size (4k)`
- `sql_select_limit (1.84E+019)`
SQL Behavior

- `sql_auto_is_null` (ON)

- `sql_mode`
  
  (PIPEDASCONCAT,ANSI_QUOTES,
  IGNORE_SPACE,ORACLE,NO_KEY_OPTIONS,
  NO_TABLE_OPTIONS,NO_FIELD_OPTIONS,
  NO_AUTO_CREATE_USER)

- `sql_quote_show_create` (ON)
SQL Behavior

- sql_safe_updates (OFF)
  - also called i-am-a-dummy

- updatable_views_with_limit (YES)

- new (OFF)

- old (OFF)
Functions

- have_compress (YES)
  - Unrelated to Compression (OFF)

- have_crypt (YES)

- local_infile (ON)
Features

- `read_only` (OFF)
- `have_dynamic_loading` (YES)
- `have_partitioning` (YES)
Features

- event_scheduler (OFF)
- have_geometry (YES)
- have_rtree_keys (YES)
- have_symlink (YES)
Other Variables

- locked_in_memory (OFF)
- bulk_insert_buffer_size (8 Mb)
- group_concat_max_len (1024)
- Created_tmp_files (40)
Variables not covered

- SSL:
  - have_ssl
  - have_openssl
  - Ssl_ and ssl_
- Prepared_stmt_cnt (0)
- engine_condition_pushdown (OFF)
- Most Com_ and Handler_
Variables That Are Not Useful

- big_tables (OFF)
  - sql_big_tables

- old_alter_table (OFF)

- pseudo_thread_id (0)
Not used/Not useful

- multi_range_count (256)
- table_lock_wait_timeout (50)
- rpl_recovery_rank (0)
- Rpl_status (NULL)
These variables are not used

- `time_format (%H:%i:%s)`
- `date_format (%Y-%m-%d)`
- `datetime_format (%Y-%m-%d %H:%i:%s)`
- `innodb_file_io_threads (4)`
  - used on Windows only
Mostly Unused Variables

- `log_tc_size (24Kb)`
  - not shown in SHOW GLOBAL VARIABLES

- `Tc_log_max_pages_used (0)`

- `Tc_log_page_size (0)`

- `Tc_log_page_waits (5) `
Thank You.

Win a signed copy of Sheeri’s book.

Leave your business card and you could win a book. We’ll invite you to read our blog posts, follow us on twitter, and join our next webinars.

Drawing will be immediately after the talk once all cards are collected.
Thank You

Questions, Comments, Feedback?

Sheeri Cabral
cabral@pythian.com


Ask me about saving 15% on our Adoption Accelerator for MySQL while at MySQL Conference 2010!