MySQL服务管理

MyS QL服务器（mysqld）是在MySQL安装中完成大部分工作的主要程序。本章提供了MySQL服务器的概述，并涉及一般的服务器管理。

- 服务器配置

- 数据目录，特别是mysql系统模式

- 服务器日志文件

- 一台机器上多个服务器的管理

关于管理主题的其他信息，还请参见。

- 第6章，安全

- 第7章，备份和恢复

- 第17章，复制

## 5.1 MySQL服务器

mysqld是MySQL服务器。下面的讨论涵盖了这些MySQL服务器配置主题。

- 服务器支持的启动选项。你可以在命令行上指定这些选项，也可以通过配置文件指定，或者两者都指定。

- 服务器系统变量。这些变量反映了启动选项的当前状态和值，其中一些可以在服务器运行时修改。

- 服务器状态变量。这些变量包含关于运行时操作的计数器和统计数据。

- 如何设置服务器的SQL模式。这个设置修改了SQL语法和语义的某些方面，例如，为了与其他数据库系统的代码兼容，或者控制特定情况下的错误处理。

- 服务器如何管理客户端连接。

- 配置和使用 IPv6 和网络命名空间支持。

- 配置和使用时区支持。

- 使用资源组。

- 服务器端的帮助功能。

- 为启用客户端会话状态变化而提供的能力。

- 服务器关机过程。根据表的类型（事务性或非事务性）和是否使用复制，有性能和可靠性方面的考虑。

关于在MySQL 8.0中增加、废弃或删除的MySQL服务器变量和选项的列表，见第1.4节 "在MySQL 8.0中增加、废弃或删除的服务器和状态变量和选项"。

注意

并非所有的存储引擎都受到所有MySQL服务器二进制文件和配置的支持。要了解如何确定你的MySQL服务器安装支持哪些存储引擎，请参见第13.7.7.16节，"SHOW ENGINES语句"。

### 5.1.1 配置服务器

MySQL服务器mysqld有许多命令选项和系统变量，可以在启动时设置以配置其操作。要确定服务器使用的默认命令选项和系统变量值，执行这个命令。

shell> mysqld --verbose --help

该命令产生一个所有mysqld选项和可配置系统变量的列表。它的输出包括默认选项和变量值，看起来像这样。

abort-slave-event-count 0

allow-suspicious-udfs FALSE

archive ON

auto-increment-increment 1

auto-increment-offset 1

autocommit TRUE

automatic-sp-privileges TRUE

avoid-temporal-upgrade FALSE

back-log 80

basedir /home/jon/bin/mysql-8.0/

...

tmpdir /tmp

transaction-alloc-block-size 8192

transaction-isolation REPEATABLE-READ

transaction-prealloc-size 4096

transaction-read-only FALSE

transaction-write-set-extraction XXHASH64

updatable-views-with-limit YES

validate-user-plugins TRUE

verbose TRUE

wait-timeout 28800

要查看服务器运行时实际使用的当前系统变量值，请连接到它并执行此语句。

mysql> SHOW VARIABLES。

要查看正在运行的服务器的一些统计和状态指标，执行这个语句。

mysql> SHOW STATUS。

系统变量和状态信息也可以通过mysqladmin命令获得。

shell> mysqladmin variables

shell> mysqladmin extended-status

关于所有命令选项、系统变量和状态变量的完整描述，见这些章节。

- 第5.1.7节，"服务器命令选项"

- 第5.1.8节，"服务器系统变量"

- 第5.1.10节，"服务器状态变量"

更详细的监控信息可从性能模式中获得；见第27章，MySQL性能模式。此外，MySQL sys模式是一组对象，它提供了对性能模式所收集数据的方便访问；参见第28章，MySQL sys模式。

如果你在命令行中为mysqld或mysqld\_safe指定一个选项，它只对服务器的那次调用有效。要在服务器每次运行时使用该选项，请把它放在一个选项文件中。参见第4.2.2.2节，"使用选项文件"。

### 5.1.2默认服务端配置

The MySQL server has many operating parameters, which you can change at server startup using command-line options or configuration files (option files). It is also possible to change many parameters at runtime. For general instructions on setting parameters at startup or runtime, see [Section 5.1.7, “Server Command Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-options), and [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

On Windows, MySQL Installer interacts with the user and creates a file named my.ini in the base installation directory as the default option file.

**Note**

On Windows, the .ini or .cnf option file extension might not be displayed.

After completing the installation process, you can edit the default option file at any time to modify the parameters used by the server. For example, to use a parameter setting in the file that is commented with a **#** character at the beginning of the line, remove the **#**, and modify the parameter value if necessary. To disable a setting, either add a **#** to the beginning of the line or remove it.

For non-Windows platforms, no default option file is created during either the server installation or the data directory initialization process. Create your option file by following the instructions given in [Section 4.2.2.2, “Using Option Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-files). Without an option file, the server just starts with its default settings—see [Section 5.1.2, “Server Configuration Defaults”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-configuration-defaults) on how to check those settings.

For additional information about option file format and syntax, see [Section 4.2.2.2, “Using Option Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-files).

### 5.1.3 验证服务端配置

As of MySQL 8.0.16, MySQL Server supports a [--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) option that enables the startup configuration to be checked for problems without running the server in normal operational mode:

mysqld --validate-config

If no errors are found, the server terminates with an exit code of 0. If an error is found, the server displays a diagnostic message and terminates with an exit code of 1. For example:

shell> **mysqld --validate-config --no-such-option**

2018-11-05T17:50:12.738919Z 0 [ERROR] [MY-000068] [Server] unknown

option '--no-such-option'.

2018-11-05T17:50:12.738962Z 0 [ERROR] [MY-010119] [Server] Aborting

The server terminates as soon as any error is found. For additional checks to occur, correct the initial problem and run the server with [--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) again.

For the preceding example, where use of [--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) results in display of an error message, the server exit code is 1. Warning and information messages may also be displayed, depending on the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value, but do not produce immediate validation termination or an exit code of 1. For example, this command produces multiple warnings, both of which are displayed. But no error occurs, so the exit code is 0:

shell> **mysqld --validate-config --log\_error\_verbosity=2**

**--read-only=s --transaction\_read\_only=s**

2018-11-05T15:43:18.445863Z 0 [Warning] [MY-000076] [Server] option

'read\_only': boolean value 's' was not recognized. Set to OFF.

2018-11-05T15:43:18.445882Z 0 [Warning] [MY-000076] [Server] option

'transaction-read-only': boolean value 's' was not recognized. Set to OFF.

This command produces the same warnings, but also an error, so the error message is displayed along with the warnings and the exit code is 1:

shell> **mysqld --validate-config --log\_error\_verbosity=2**

**--no-such-option --read-only=s --transaction\_read\_only=s**

2018-11-05T15:43:53.152886Z 0 [Warning] [MY-000076] [Server] option

'read\_only': boolean value 's' was not recognized. Set to OFF.

2018-11-05T15:43:53.152913Z 0 [Warning] [MY-000076] [Server] option

'transaction-read-only': boolean value 's' was not recognized. Set to OFF.

2018-11-05T15:43:53.164889Z 0 [ERROR] [MY-000068] [Server] unknown

option '--no-such-option'.

2018-11-05T15:43:53.165053Z 0 [ERROR] [MY-010119] [Server] Aborting

The scope of the [--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) option is limited to configuration checking that the server can perform without undergoing its normal startup process. As such, the configuration check does not initialize storage engines and other plugins, components, and so forth, and does not validate options associated with those uninitialized subsystems.

[--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) can be used any time, but is particularly useful after an upgrade, to check whether any options previously used with the older server are considered by the upgraded server to be deprecated or obsolete. For example, the **tx\_read\_only** system variable was deprecated in MySQL 5.7 and removed in 8.0. Suppose that a MySQL 5.7 server was run using that system variable in its my.cnf file and then upgraded to MySQL 8.0. Running the upgraded server with [--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) to check the configuration produces this result:

shell> **mysqld --validate-config**

2018-11-05T10:40:02.712141Z 0 [ERROR] [MY-000067] [Server] unknown variable

'tx\_read\_only=ON'.

2018-11-05T10:40:02.712178Z 0 [ERROR] [MY-010119] [Server] Aborting

[--validate-config](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) can be used with the [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) option to validate only the options in a specific file:

shell> **mysqld --defaults-file=./my.cnf-test --validate-config**

2018-11-05T10:40:02.712141Z 0 [ERROR] [MY-000067] [Server] unknown variable

'tx\_read\_only=ON'.

2018-11-05T10:40:02.712178Z 0 [ERROR] [MY-010119] [Server] Aborting

Remember that [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file), if specified, must be the first option on the command line. (Executing the preceding example with the option order reversed produces a message that [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) itself is unknown.)

### 5.1.4 可选服务端配置、系统变量和变量参考

The following table lists all command-line options, system variables, and status variables applicable within **mysqld**.

The table lists command-line options (Cmd-line), options valid in configuration files (Option file), server system variables (System Var), and status variables (Status var) in one unified list, with an indication of where each option or variable is valid. If a server option set on the command line or in an option file differs from the name of the corresponding system variable, the variable name is noted immediately below the corresponding option. For system and status variables, the scope of the variable (Var Scope) is Global, Session, or both. Please see the corresponding item descriptions for details on setting and using the options and variables. Where appropriate, direct links to further information about the items are provided.

For a version of this table that is specific to NDB Cluster, see [Section 23.3.2.5, “NDB Cluster mysqld Option and Variable Reference”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#mysql-cluster-option-tables).

**Table 5.1 Command-Line Option, System Variable, and Status Variable Summary**

| Name | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
| --- | --- | --- | --- | --- | --- | --- |
| [**abort-slave-event-count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_abort-slave-event-count) | Yes | Yes |  |  |  |  |
| [**Aborted\_clients**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Aborted_clients) |  |  |  | Yes | Global | No |
| [**Aborted\_connects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Aborted_connects) |  |  |  | Yes | Global | No |
| [**Acl\_cache\_items\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Acl_cache_items_count) |  |  |  | Yes | Global | No |
| [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) | Yes | Yes | Yes |  | Global | No |
| [**admin\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_port) | Yes | Yes | Yes |  | Global | No |
| [**admin-ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) | Yes | Yes |  |  |  |  |
| [**admin\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_ca) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_capath) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cert) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cipher) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crl) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crlpath) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_key) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_ciphersuites) | Yes | Yes | Yes |  | Global | Yes |
| [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) | Yes | Yes | Yes |  | Global | Yes |
| [**allow-suspicious-udfs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_allow-suspicious-udfs) | Yes | Yes |  |  |  |  |
| [**ansi**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ansi) | Yes | Yes |  |  |  |  |
| [**audit-log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_audit-log) | Yes | Yes |  |  |  |  |
| [**audit\_log\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_buffer_size) | Yes | Yes | Yes |  | Global | No |
| [**audit\_log\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_compression) | Yes | Yes | Yes |  | Global | No |
| [**audit\_log\_connection\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_connection_policy) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_current\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_current_session) |  |  | Yes |  | Both | No |
| [**Audit\_log\_current\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_current_size) |  |  |  | Yes | Global | No |
| [**audit\_log\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_encryption) | Yes | Yes | Yes |  | Global | No |
| [**Audit\_log\_event\_max\_drop\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_event_max_drop_size) |  |  |  | Yes | Global | No |
| [**Audit\_log\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events) |  |  |  | Yes | Global | No |
| [**Audit\_log\_events\_filtered**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events_filtered) |  |  |  | Yes | Global | No |
| [**Audit\_log\_events\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events_lost) |  |  |  | Yes | Global | No |
| [**Audit\_log\_events\_written**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events_written) |  |  |  | Yes | Global | No |
| [**audit\_log\_exclude\_accounts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_exclude_accounts) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_file) | Yes | Yes | Yes |  | Global | No |
| [**audit\_log\_filter\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_filter_id) |  |  | Yes |  | Both | No |
| [**audit\_log\_flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_flush) |  |  | Yes |  | Global | Yes |
| [**audit\_log\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_format) | Yes | Yes | Yes |  | Global | No |
| [**audit\_log\_include\_accounts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_include_accounts) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_max_size) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_password\_history\_keep\_days**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_password_history_keep_days) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_policy) | Yes | Yes | Yes |  | Global | No |
| [**audit\_log\_prune\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_prune_seconds) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_read_buffer_size) | Yes | Yes | Yes |  | Varies | Varies |
| [**audit\_log\_rotate\_on\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_rotate_on_size) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_statement\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_statement_policy) | Yes | Yes | Yes |  | Global | Yes |
| [**audit\_log\_strategy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_strategy) | Yes | Yes | Yes |  | Global | No |
| [**Audit\_log\_total\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_total_size) |  |  |  | Yes | Global | No |
| [**Audit\_log\_write\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_write_waits) |  |  |  | Yes | Global | No |
| [**authentication\_ldap\_sasl\_auth\_method\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_auth_method_name) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_bind\_base\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_base_dn) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_bind\_root\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_root_dn) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_bind\_root\_pwd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_root_pwd) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_ca_path) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_group\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_group_search_attr) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_group\_search\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_group_search_filter) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_init\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_init_pool_size) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_log\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_log_status) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_max\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_max_pool_size) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_referral**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_referral) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_server\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_server_host) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_server\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_server_port) | Yes | Yes | Yes |  | Global | Yes |
| [**Authentication\_ldap\_sasl\_supported\_methods**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Authentication_ldap_sasl_supported_methods) |  |  |  | Yes | Global | No |
| [**authentication\_ldap\_sasl\_tls**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_tls) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_sasl\_user\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_user_search_attr) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_auth\_method\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_auth_method_name) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_bind\_base\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_base_dn) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_bind\_root\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_root_dn) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_bind\_root\_pwd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_root_pwd) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_ca_path) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_group\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_group_search_attr) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_group\_search\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_group_search_filter) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_init\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_init_pool_size) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_log\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_log_status) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_max\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_max_pool_size) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_referral**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_referral) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_server\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_server_host) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_server\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_server_port) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_tls**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_tls) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_ldap\_simple\_user\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_user_search_attr) | Yes | Yes | Yes |  | Global | Yes |
| [**authentication\_windows\_log\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_authentication_windows_log_level) | Yes | Yes | Yes |  | Global | No |
| [**authentication\_windows\_use\_principal\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_authentication_windows_use_principal_name) | Yes | Yes | Yes |  | Global | No |
| [**auto\_generate\_certs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_auto_generate_certs) | Yes | Yes | Yes |  | Global | No |
| [**auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_increment) | Yes | Yes | Yes |  | Both | Yes |
| [**auto\_increment\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_offset) | Yes | Yes | Yes |  | Both | Yes |
| [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) | Yes | Yes | Yes |  | Both | Yes |
| [**automatic\_sp\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges) | Yes | Yes | Yes |  | Global | Yes |
| [**avoid\_temporal\_upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_avoid_temporal_upgrade) | Yes | Yes | Yes |  | Global | Yes |
| [**back\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_back_log) | Yes | Yes | Yes |  | Global | No |
| [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) | Yes | Yes | Yes |  | Global | No |
| [**big\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_big_tables) | Yes | Yes | Yes |  | Both | Yes |
| [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) | Yes | Yes | Yes |  | Global | No |
| [**Binlog\_cache\_disk\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_cache_disk_use) |  |  |  | Yes | Global | No |
| [**binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**Binlog\_cache\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_cache_use) |  |  |  | Yes | Global | No |
| [**binlog-checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-checksum) | Yes | Yes |  |  |  |  |
| [**binlog\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_checksum) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_direct\_non\_transactional\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_direct_non_transactional_updates) | Yes | Yes | Yes |  | Both | Yes |
| [**binlog-do-db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-do-db) | Yes | Yes |  |  |  |  |
| [**binlog\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_encryption) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_error\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_error_action) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_expire\_logs\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_expire_logs_seconds) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) | Yes | Yes | Yes |  | Both | Yes |
| [**binlog\_group\_commit\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_group_commit_sync_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_group\_commit\_sync\_no\_delay\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_group_commit_sync_no_delay_count) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_gtid\_simple\_recovery**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_gtid_simple_recovery) | Yes | Yes | Yes |  | Global | No |
| [**binlog-ignore-db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-ignore-db) | Yes | Yes |  |  |  |  |
| [**binlog\_max\_flush\_queue\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_max_flush_queue_time) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_order\_commits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_order_commits) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_rotate\_encryption\_master\_key\_at\_startup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_rotate_encryption_master_key_at_startup) | Yes | Yes | Yes |  | Global | No |
| [**binlog\_row\_event\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-row-event-max-size) | Yes | Yes | Yes |  | Global | No |
| [**binlog\_row\_image**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_image) | Yes | Yes | Yes |  | Both | Yes |
| [**binlog\_row\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_metadata) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_row\_value\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_value_options) | Yes | Yes | Yes |  | Both | Yes |
| [**binlog\_rows\_query\_log\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_rows_query_log_events) | Yes | Yes | Yes |  | Both | Yes |
| [**Binlog\_stmt\_cache\_disk\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_stmt_cache_disk_use) |  |  |  | Yes | Global | No |
| [**binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_stmt_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**Binlog\_stmt\_cache\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_stmt_cache_use) |  |  |  | Yes | Global | No |
| [**binlog\_transaction\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression) | Yes | Yes | Yes |  | Both | Yes |
| [**binlog\_transaction\_compression\_level\_zstd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression_level_zstd) | Yes | Yes | Yes |  | Both | Yes |
| [**binlog\_transaction\_dependency\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_dependency_history_size) | Yes | Yes | Yes |  | Global | Yes |
| [**binlog\_transaction\_dependency\_tracking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_dependency_tracking) | Yes | Yes | Yes |  | Global | Yes |
| [**block\_encryption\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_block_encryption_mode) | Yes | Yes | Yes |  | Both | Yes |
| [**bulk\_insert\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bulk_insert_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**Bytes\_received**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Bytes_received) |  |  |  | Yes | Both | No |
| [**Bytes\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Bytes_sent) |  |  |  | Yes | Both | No |
| [**caching\_sha2\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_auto_generate_rsa_keys) | Yes | Yes | Yes |  | Global | No |
| [**caching\_sha2\_password\_digest\_rounds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_digest_rounds) | Yes | Yes | Yes |  | Global | No |
| [**caching\_sha2\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_private_key_path) | Yes | Yes | Yes |  | Global | No |
| [**caching\_sha2\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_public_key_path) | Yes | Yes | Yes |  | Global | No |
| [**Caching\_sha2\_password\_rsa\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Caching_sha2_password_rsa_public_key) |  |  |  | Yes | Global | No |
| [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) |  |  | Yes |  | Both | Yes |
| [**character-set-client-handshake**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_character-set-client-handshake) | Yes | Yes |  |  |  |  |
| [**character\_set\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_connection) |  |  | Yes |  | Both | Yes |
| [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) (note 1) |  |  | Yes |  | Both | Yes |
| [**character\_set\_filesystem**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_filesystem) | Yes | Yes | Yes |  | Both | Yes |
| [**character\_set\_results**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_results) |  |  | Yes |  | Both | Yes |
| [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server) | Yes | Yes | Yes |  | Both | Yes |
| [**character\_set\_system**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_system) |  |  | Yes |  | Global | No |
| [**character\_sets\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_sets_dir) | Yes | Yes | Yes |  | Global | No |
| [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) | Yes | Yes | Yes |  | Global | Yes |
| [**chroot**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_chroot) | Yes | Yes |  |  |  |  |
| [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_buffer_size) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ddl\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ddl_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_enable\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_enable_compression) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_max\_network\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_network_bandwidth) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_ca) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_cert) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_key) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) | Yes | Yes | Yes |  | Global | Yes |
| [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection) |  |  | Yes |  | Both | Yes |
| [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) (note 1) |  |  | Yes |  | Both | Yes |
| [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server) | Yes | Yes | Yes |  | Both | Yes |
| [**Com\_admin\_commands**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_event**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_function**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_procedure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_resource\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_alter\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_tablespace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_alter\_user\_default\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_analyze**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_assign\_to\_keycache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_begin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_call\_procedure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_change\_db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_change\_master**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_change\_repl\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_clone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_commit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_event**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_function**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_procedure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_resource\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_create\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_create\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_trigger**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_udf**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_create\_view**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_dealloc\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_delete**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_delete\_multi**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_do**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_event**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_function**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_procedure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_resource\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_drop\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_drop\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_trigger**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_drop\_view**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_empty\_query**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_execute\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_explain\_other**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_get\_diagnostics**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_grant**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_grant\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_group\_replication\_start**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_group\_replication\_stop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_ha\_close**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_ha\_open**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_ha\_read**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_help**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_insert\_select**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_install\_component**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_install\_plugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_kill**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_lock\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_optimize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_preload\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_prepare\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_purge**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_purge\_before\_date**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_release\_savepoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_rename\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_rename\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_repair**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_replace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_replace\_select**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_replica\_start**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_replica\_stop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_reset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_resignal**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_restart**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_revoke**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_revoke\_all**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_revoke\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_rollback**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_rollback\_to\_savepoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_savepoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_select**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_set\_option**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_set\_resource\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_set\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_show\_authors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_binlog\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_binlogs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_charsets**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_collations**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_contributors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_event**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_func**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_proc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_trigger**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_create\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_databases**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_engine\_logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_engine\_mutex**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_engine\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_fields**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_function\_code**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_function\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_grants**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_master\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_ndb\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_open\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_plugins**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_procedure\_code**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_procedure\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_processlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_profile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_profiles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_relaylog\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_replica\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_replicas**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_slave\_hosts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_slave\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_table\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_triggers**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_show\_warnings**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_signal**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_slave\_start**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_slave\_stop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_close**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_execute**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_fetch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_prepare**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_reprepare**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_reset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_stmt\_send\_long\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_truncate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_uninstall\_component**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Global | No |
| [**Com\_uninstall\_plugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_unlock\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_update\_multi**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_xa\_commit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_xa\_end**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_xa\_prepare**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_xa\_recover**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_xa\_rollback**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**Com\_xa\_start**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) |  |  |  | Yes | Both | No |
| [**completion\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_completion_type) | Yes | Yes | Yes |  | Both | Yes |
| [**Compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Compression) |  |  |  | Yes | Session | No |
| [**Compression\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Compression_algorithm) |  |  |  | Yes | Global | No |
| [**Compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Compression_level) |  |  |  | Yes | Global | No |
| [**concurrent\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_concurrent_insert) | Yes | Yes | Yes |  | Global | Yes |
| [**connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_connect_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**Connection\_control\_delay\_generated**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Connection_control_delay_generated) |  |  |  | Yes | Global | No |
| [**connection\_control\_failed\_connections\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_failed_connections_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**connection\_control\_max\_connection\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_max_connection_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**connection\_control\_min\_connection\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_min_connection_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**Connection\_errors\_accept**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_accept) |  |  |  | Yes | Global | No |
| [**Connection\_errors\_internal**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_internal) |  |  |  | Yes | Global | No |
| [**Connection\_errors\_max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_max_connections) |  |  |  | Yes | Global | No |
| [**Connection\_errors\_peer\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_peer_address) |  |  |  | Yes | Global | No |
| [**Connection\_errors\_select**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_select) |  |  |  | Yes | Global | No |
| [**Connection\_errors\_tcpwrap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_tcpwrap) |  |  |  | Yes | Global | No |
| [**Connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connections) |  |  |  | Yes | Global | No |
| [**console**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console) | Yes | Yes |  |  |  |  |
| [**core-file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_core-file) | Yes | Yes |  |  |  |  |
| [**core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_core_file) |  |  | Yes |  | Global | No |
| [**create\_admin\_listener\_thread**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_create_admin_listener_thread) | Yes | Yes | Yes |  | Global | No |
| [**Created\_tmp\_disk\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) |  |  |  | Yes | Both | No |
| [**Created\_tmp\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_files) |  |  |  | Yes | Global | No |
| [**Created\_tmp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) |  |  |  | Yes | Both | No |
| [**cte\_max\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_cte_max_recursion_depth) | Yes | Yes | Yes |  | Both | Yes |
| [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca) |  |  |  | Yes | Global | No |
| [**Current\_tls\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_capath) |  |  |  | Yes | Global | No |
| [**Current\_tls\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_cert) |  |  |  | Yes | Global | No |
| [**Current\_tls\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_cipher) |  |  |  | Yes | Global | No |
| [**Current\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ciphersuites) |  |  |  | Yes | Global | No |
| [**Current\_tls\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_crl) |  |  |  | Yes | Global | No |
| [**Current\_tls\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_crlpath) |  |  |  | Yes | Global | No |
| [**Current\_tls\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_key) |  |  |  | Yes | Global | No |
| [**Current\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_version) |  |  |  | Yes | Global | No |
| [**daemon\_memcached\_enable\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_enable_binlog) | Yes | Yes | Yes |  | Global | No |
| [**daemon\_memcached\_engine\_lib\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_engine_lib_name) | Yes | Yes | Yes |  | Global | No |
| [**daemon\_memcached\_engine\_lib\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_engine_lib_path) | Yes | Yes | Yes |  | Global | No |
| [**daemon\_memcached\_option**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_option) | Yes | Yes | Yes |  | Global | No |
| [**daemon\_memcached\_r\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_r_batch_size) | Yes | Yes | Yes |  | Global | No |
| [**daemon\_memcached\_w\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_w_batch_size) | Yes | Yes | Yes |  | Global | No |
| [**daemonize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_daemonize) | Yes | Yes |  |  |  |  |
| [**datadir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) | Yes | Yes | Yes |  | Global | No |
| [**ddl-rewriter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ddl-rewriter) | Yes | Yes |  |  |  |  |
| [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) | Yes | Yes | Yes |  | Both | Yes |
| [**debug\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug_sync) |  |  | Yes |  | Session | Yes |
| [**debug-sync-timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug-sync-timeout) | Yes | Yes |  |  |  |  |
| [**default\_authentication\_plugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_authentication_plugin) | Yes | Yes | Yes |  | Global | No |
| [**default\_collation\_for\_utf8mb4**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_collation_for_utf8mb4) |  |  | Yes |  | Both | Yes |
| [**default\_password\_lifetime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_password_lifetime) | Yes | Yes | Yes |  | Global | Yes |
| [**default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) | Yes | Yes | Yes |  | Both | Yes |
| [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) | Yes | Yes | Yes |  | Both | Yes |
| [**default-time-zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_default-time-zone) | Yes | Yes |  |  |  |  |
| [**default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) | Yes | Yes | Yes |  | Both | Yes |
| [**default\_week\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_week_format) | Yes | Yes | Yes |  | Both | Yes |
| [**defaults-extra-file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-extra-file) | Yes |  |  |  |  |  |
| [**defaults-file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-file) | Yes |  |  |  |  |  |
| [**defaults-group-suffix**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-group-suffix) | Yes |  |  |  |  |  |
| [**delay\_key\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delay_key_write) | Yes | Yes | Yes |  | Global | Yes |
| [**Delayed\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Delayed_errors) |  |  |  | Yes | Global | No |
| [**delayed\_insert\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**Delayed\_insert\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Delayed_insert_threads) |  |  |  | Yes | Global | No |
| [**delayed\_insert\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**delayed\_queue\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_queue_size) | Yes | Yes | Yes |  | Global | Yes |
| [**Delayed\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Delayed_writes) |  |  |  | Yes | Global | No |
| [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) | Yes | Yes | Yes |  | Global | No |
| [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password) | Yes | Yes | Yes |  | Global | No |
| [**disconnect-slave-event-count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_disconnect-slave-event-count) | Yes | Yes |  |  |  |  |
| [**div\_precision\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_div_precision_increment) | Yes | Yes | Yes |  | Both | Yes |
| [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) | Yes | Yes | Yes |  | Global | Yes |
| [**dragnet.Status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_dragnet.Status) |  |  |  | Yes | Global | No |
| [**early-plugin-load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) | Yes | Yes |  |  |  |  |
| [**end\_markers\_in\_json**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_end_markers_in_json) | Yes | Yes | Yes |  | Both | Yes |
| [**enforce\_gtid\_consistency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_enforce_gtid_consistency) | Yes | Yes | Yes |  | Global | Yes |
| [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) | Yes | Yes | Yes |  | Both | Yes |
| [**error\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_error_count) |  |  | Yes |  | Session | No |
| [**Error\_log\_buffered\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_buffered_bytes) |  |  |  | Yes | Global | No |
| [**Error\_log\_buffered\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_buffered_events) |  |  |  | Yes | Global | No |
| [**Error\_log\_expired\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_expired_events) |  |  |  | Yes | Global | No |
| [**Error\_log\_latest\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_latest_write) |  |  |  | Yes | Global | No |
| [**event\_scheduler**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_event_scheduler) | Yes | Yes | Yes |  | Global | Yes |
| [**exit-info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_exit-info) | Yes | Yes |  |  |  |  |
| [**expire\_logs\_days**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_expire_logs_days) | Yes | Yes | Yes |  | Global | Yes |
| [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) | Yes | Yes | Yes |  | Both | Yes |
| [**external-locking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_external-locking) | Yes | Yes |  |  |  |  |
| - Variable: [**skip\_external\_locking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_external_locking) |  |  |  |  |  |  |
| [**external\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_external_user) |  |  | Yes |  | Session | No |
| [**federated**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#federated-storage-engine) | Yes | Yes |  |  |  |  |
| [**Firewall\_access\_denied**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Firewall_access_denied) |  |  |  | Yes | Global | No |
| [**Firewall\_access\_granted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Firewall_access_granted) |  |  |  | Yes | Global | No |
| [**Firewall\_cached\_entries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Firewall_cached_entries) |  |  |  | Yes | Global | No |
| [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) | Yes | Yes | Yes |  | Global | Yes |
| [**Flush\_commands**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Flush_commands) |  |  |  | Yes | Global | No |
| [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) | Yes | Yes | Yes |  | Global | Yes |
| [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks) |  |  | Yes |  | Both | Yes |
| [**ft\_boolean\_syntax**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_boolean_syntax) | Yes | Yes | Yes |  | Global | Yes |
| [**ft\_max\_word\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_max_word_len) | Yes | Yes | Yes |  | Global | No |
| [**ft\_min\_word\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_min_word_len) | Yes | Yes | Yes |  | Global | No |
| [**ft\_query\_expansion\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_query_expansion_limit) | Yes | Yes | Yes |  | Global | No |
| [**ft\_stopword\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_stopword_file) | Yes | Yes | Yes |  | Global | No |
| [**gdb**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_gdb) | Yes | Yes |  |  |  |  |
| [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) | Yes | Yes | Yes |  | Global | Yes |
| [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) | Yes | Yes | Yes |  | Global | Yes |
| [**generated\_random\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_generated_random_password_length) | Yes | Yes | Yes |  | Both | Yes |
| [**group\_concat\_max\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_group_concat_max_len) | Yes | Yes | Yes |  | Both | Yes |
| [**group\_replication\_advertise\_recovery\_endpoints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_advertise_recovery_endpoints) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_allow\_local\_lower\_version\_join**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_allow_local_lower_version_join) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_auto_increment_increment) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_autorejoin\_tries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_autorejoin_tries) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_bootstrap\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_bootstrap_group) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_clone\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_clone_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_communication\_debug\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_communication_debug_options) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_communication\_max\_message\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_communication_max_message_size) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_components\_stop\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_components_stop_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_compression\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_compression_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_consistency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_consistency) | Yes | Yes | Yes |  | Both | Yes |
| [**group\_replication\_enforce\_update\_everywhere\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_enforce_update_everywhere_checks) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_exit\_state\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_exit_state_action) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_applier\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_applier_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_certifier\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_certifier_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_hold\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_hold_percent) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_max\_commit\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_max_commit_quota) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_member\_quota\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_member_quota_percent) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_min\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_min_quota) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_min\_recovery\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_min_recovery_quota) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_period) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_flow\_control\_release\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_release_percent) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_force\_members**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_force_members) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_group\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_group_name) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_group\_seeds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_group_seeds) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_gtid\_assignment\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_gtid_assignment_block_size) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_ip\_allowlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ip_allowlist) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_ip\_whitelist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ip_whitelist) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_local\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_local_address) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_member\_expel\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_member_expel_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_member\_weight**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_member_weight) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_message\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_message_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_poll\_spin\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_poll_spin_loops) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_primary\_member**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_group_replication_primary_member) |  |  |  | Yes | Global | No |
| [**group\_replication\_recovery\_complete\_at**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_complete_at) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_compression_algorithms) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_get\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_get_public_key) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_public_key_path) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_reconnect\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_reconnect_interval) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_retry_count) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_ca) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_capath) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_cert) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_cipher) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_crl) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_crlpath) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_key) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_ssl\_verify\_server\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_verify_server_cert) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_tls_ciphersuites) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_tls_version) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_use\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_use_ssl) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_recovery\_zstd\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_zstd_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_single\_primary\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_single_primary_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_ssl\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ssl_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_start\_on\_boot**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_start_on_boot) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_tls\_source**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_tls_source) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_transaction\_size\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_transaction_size_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_unreachable\_majority\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_unreachable_majority_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**group\_replication\_view\_change\_uuid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_view_change_uuid) | Yes | Yes | Yes |  | Global | Yes |
| [**gtid\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed) |  |  | Yes |  | Global | No |
| [**gtid\_executed\_compression\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed_compression_period) | Yes | Yes | Yes |  | Global | Yes |
| [**gtid\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**gtid\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_next) |  |  | Yes |  | Session | Yes |
| [**gtid\_owned**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_owned) |  |  | Yes |  | Both | No |
| [**gtid\_purged**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_purged) |  |  | Yes |  | Global | Yes |
| [**Handler\_commit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_commit) |  |  |  | Yes | Both | No |
| [**Handler\_delete**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_delete) |  |  |  | Yes | Both | No |
| [**Handler\_discover**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Handler_discover) |  |  |  | Yes | Both | No |
| [**Handler\_external\_lock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_external_lock) |  |  |  | Yes | Both | No |
| [**Handler\_mrr\_init**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_mrr_init) |  |  |  | Yes | Both | No |
| [**Handler\_prepare**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_prepare) |  |  |  | Yes | Both | No |
| [**Handler\_read\_first**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_first) |  |  |  | Yes | Both | No |
| [**Handler\_read\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_key) |  |  |  | Yes | Both | No |
| [**Handler\_read\_last**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_last) |  |  |  | Yes | Both | No |
| [**Handler\_read\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_next) |  |  |  | Yes | Both | No |
| [**Handler\_read\_prev**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_prev) |  |  |  | Yes | Both | No |
| [**Handler\_read\_rnd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_rnd) |  |  |  | Yes | Both | No |
| [**Handler\_read\_rnd\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_rnd_next) |  |  |  | Yes | Both | No |
| [**Handler\_rollback**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_rollback) |  |  |  | Yes | Both | No |
| [**Handler\_savepoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_savepoint) |  |  |  | Yes | Both | No |
| [**Handler\_savepoint\_rollback**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_savepoint_rollback) |  |  |  | Yes | Both | No |
| [**Handler\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_update) |  |  |  | Yes | Both | No |
| [**Handler\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_write) |  |  |  | Yes | Both | No |
| [**have\_compress**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_compress) |  |  | Yes |  | Global | No |
| [**have\_dynamic\_loading**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_dynamic_loading) |  |  | Yes |  | Global | No |
| [**have\_geometry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_geometry) |  |  | Yes |  | Global | No |
| [**have\_openssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_openssl) |  |  | Yes |  | Global | No |
| [**have\_profiling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_profiling) |  |  | Yes |  | Global | No |
| [**have\_query\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_query_cache) |  |  | Yes |  | Global | No |
| [**have\_rtree\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_rtree_keys) |  |  | Yes |  | Global | No |
| [**have\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_ssl) |  |  | Yes |  | Global | No |
| [**have\_statement\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_statement_timeout) |  |  | Yes |  | Global | No |
| [**have\_symlink**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_symlink) |  |  | Yes |  | Global | No |
| [**help**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_help) | Yes | Yes |  |  |  |  |
| [**histogram\_generation\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_histogram_generation_max_mem_size) | Yes | Yes | Yes |  | Both | Yes |
| [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**hostname**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_hostname) |  |  | Yes |  | Global | No |
| [**identity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_identity) |  |  | Yes |  | Session | Yes |
| [**immediate\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_immediate_server_version) |  |  | Yes |  | Session | Yes |
| [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) | Yes | Yes | Yes |  | Both | Yes |
| [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) | Yes | Yes | Yes |  | Global | Yes |
| [**init\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_file) | Yes | Yes | Yes |  | Global | No |
| [**init\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_init_slave) | Yes | Yes | Yes |  | Global | Yes |
| [**initialize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize) | Yes | Yes |  |  |  |  |
| [**initialize-insecure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure) | Yes | Yes |  |  |  |  |
| [**innodb**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#option_mysqld_innodb) | Yes | Yes |  |  |  |  |
| [**innodb\_adaptive\_flushing**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_flushing) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_adaptive\_flushing\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_flushing_lwm) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_adaptive\_hash\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_hash_index) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_adaptive\_hash\_index\_parts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_hash_index_parts) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_adaptive\_max\_sleep\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_max_sleep_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_api\_bk\_commit\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_bk_commit_interval) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_api\_disable\_rowlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_disable_rowlock) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_api\_enable\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_enable_binlog) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_api\_enable\_mdl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_enable_mdl) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_api\_trx\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_trx_level) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_autoextend\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_autoextend_increment) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_autoinc\_lock\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_autoinc_lock_mode) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_background\_drop\_list\_empty**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_background_drop_list_empty) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_buffer\_pool\_bytes\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_bytes_data) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_bytes\_dirty**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_bytes_dirty) |  |  |  | Yes | Global | No |
| [**innodb\_buffer\_pool\_chunk\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_chunk_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_buffer\_pool\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_debug) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_buffer\_pool\_dump\_at\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_at_shutdown) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_buffer\_pool\_dump\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_now) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_buffer\_pool\_dump\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_pct) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_buffer\_pool\_dump\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_dump_status) |  |  |  | Yes | Global | No |
| [**innodb\_buffer\_pool\_filename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_filename) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_buffer\_pool\_in\_core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_in_core_file) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_buffer\_pool\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_instances) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_buffer\_pool\_load\_abort**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_abort) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_buffer\_pool\_load\_at\_startup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_at_startup) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_buffer\_pool\_load\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_now) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_buffer\_pool\_load\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_load_status) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_data) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_dirty**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_dirty) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_flushed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_flushed) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_free**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_free) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_latched**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_latched) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_misc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_misc) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_pages\_total**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_total) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_read\_ahead**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_ahead) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_read\_ahead\_evicted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_ahead_evicted) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_read\_ahead\_rnd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_ahead_rnd) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_read\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_requests) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_reads) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_resize\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_resize_status) |  |  |  | Yes | Global | No |
| [**innodb\_buffer\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_size) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_buffer\_pool\_wait\_free**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_wait_free) |  |  |  | Yes | Global | No |
| [**Innodb\_buffer\_pool\_write\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_write_requests) |  |  |  | Yes | Global | No |
| [**innodb\_change\_buffer\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffer_max_size) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_change\_buffering**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffering) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_change\_buffering\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffering_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_checkpoint\_disabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_checkpoint_disabled) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_checksum\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_checksum_algorithm) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_cmp\_per\_index\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_cmp_per_index_enabled) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_commit\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_commit_concurrency) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_compress\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compress_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_compression\_failure\_threshold\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_failure_threshold_pct) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_compression\_pad\_pct\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_pad_pct_max) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_concurrency\_tickets**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_concurrency_tickets) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_file_path) | Yes | Yes | Yes |  | Global | No |
| [**Innodb\_data\_fsyncs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_fsyncs) |  |  |  | Yes | Global | No |
| [**innodb\_data\_home\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_home_dir) | Yes | Yes | Yes |  | Global | No |
| [**Innodb\_data\_pending\_fsyncs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_pending_fsyncs) |  |  |  | Yes | Global | No |
| [**Innodb\_data\_pending\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_pending_reads) |  |  |  | Yes | Global | No |
| [**Innodb\_data\_pending\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_pending_writes) |  |  |  | Yes | Global | No |
| [**Innodb\_data\_read**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_read) |  |  |  | Yes | Global | No |
| [**Innodb\_data\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_reads) |  |  |  | Yes | Global | No |
| [**Innodb\_data\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_writes) |  |  |  | Yes | Global | No |
| [**Innodb\_data\_written**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_written) |  |  |  | Yes | Global | No |
| [**Innodb\_dblwr\_pages\_written**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_dblwr_pages_written) |  |  |  | Yes | Global | No |
| [**Innodb\_dblwr\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_dblwr_writes) |  |  |  | Yes | Global | No |
| [**innodb\_ddl\_log\_crash\_reset\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ddl_log_crash_reset_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_deadlock\_detect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_deadlock_detect) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_dedicated\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_dedicated_server) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_default\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_default_row_format) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_directories**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_directories) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_disable\_sort\_file\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_disable_sort_file_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_doublewrite**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_doublewrite\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_batch_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_doublewrite\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_dir) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_doublewrite\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_files) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_doublewrite\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_pages) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_extend\_and\_initialize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_extend_and_initialize) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_fast\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fast_shutdown) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_fil\_make\_page\_dirty\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fil_make_page_dirty_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_file\_per\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_fill\_factor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fill_factor) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_flush\_log\_at\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_log_at_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_flush\_log\_at\_trx\_commit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_log_at_trx_commit) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_flush\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_method) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_flush\_neighbors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_neighbors) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_flush\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_sync) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_flushing\_avg\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flushing_avg_loops) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_force\_load\_corrupted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_force_load_corrupted) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_force\_recovery**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_force_recovery) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_fsync\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fsync_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_ft\_aux\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_aux_table) |  |  | Yes |  | Global | Yes |
| [**innodb\_ft\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_cache_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_ft\_enable\_diag\_print**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_enable_diag_print) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_ft\_enable\_stopword**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_enable_stopword) | Yes | Yes | Yes |  | Both | Yes |
| [**innodb\_ft\_max\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_max_token_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_ft\_min\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_min_token_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_ft\_num\_word\_optimize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_num_word_optimize) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_ft\_result\_cache\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_result_cache_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_ft\_server\_stopword\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_server_stopword_table) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_ft\_sort\_pll\_degree**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_sort_pll_degree) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_ft\_total\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_total_cache_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_ft\_user\_stopword\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_user_stopword_table) | Yes | Yes | Yes |  | Both | Yes |
| [**Innodb\_have\_atomic\_builtins**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_have_atomic_builtins) |  |  |  | Yes | Global | No |
| [**innodb\_idle\_flush\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_idle_flush_pct) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_io\_capacity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_io_capacity) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_io\_capacity\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_io_capacity_max) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_limit\_optimistic\_insert\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_limit_optimistic_insert_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_lock_wait_timeout) | Yes | Yes | Yes |  | Both | Yes |
| [**innodb\_log\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_buffer_size) | Yes | Yes | Yes |  | Global | Varies |
| [**innodb\_log\_checkpoint\_fuzzy\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checkpoint_fuzzy_now) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_log\_checkpoint\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checkpoint_now) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_log\_checksums**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checksums) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_log\_compressed\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_compressed_pages) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_log\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_file_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_log\_files\_in\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_files_in_group) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_log\_group\_home\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_group_home_dir) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_log\_spin\_cpu\_abs\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_spin_cpu_abs_lwm) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_log\_spin\_cpu\_pct\_hwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_spin_cpu_pct_hwm) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_log\_wait\_for\_flush\_spin\_hwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_wait_for_flush_spin_hwm) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_log\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_log_waits) |  |  |  | Yes | Global | No |
| [**innodb\_log\_write\_ahead\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_write_ahead_size) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_log\_write\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_log_write_requests) |  |  |  | Yes | Global | No |
| [**innodb\_log\_writer\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_writer_threads) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_log\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_log_writes) |  |  |  | Yes | Global | No |
| [**innodb\_lru\_scan\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_lru_scan_depth) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_max\_dirty\_pages\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_dirty_pages_pct) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_max\_dirty\_pages\_pct\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_dirty_pages_pct_lwm) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_max\_purge\_lag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_purge_lag) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_max\_purge\_lag\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_purge_lag_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_max\_undo\_log\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_undo_log_size) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_merge\_threshold\_set\_all\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_merge_threshold_set_all_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_monitor\_disable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_disable) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_monitor\_enable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_enable) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_monitor\_reset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_reset) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_monitor\_reset\_all**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_reset_all) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_num\_open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_num_open_files) |  |  |  | Yes | Global | No |
| [**innodb\_numa\_interleave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_numa_interleave) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_old\_blocks\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_old_blocks_pct) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_old\_blocks\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_old_blocks_time) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_online\_alter\_log\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_online_alter_log_max_size) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_open_files) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_optimize\_fulltext\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_optimize_fulltext_only) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_os\_log\_fsyncs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_fsyncs) |  |  |  | Yes | Global | No |
| [**Innodb\_os\_log\_pending\_fsyncs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_pending_fsyncs) |  |  |  | Yes | Global | No |
| [**Innodb\_os\_log\_pending\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_pending_writes) |  |  |  | Yes | Global | No |
| [**Innodb\_os\_log\_written**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_written) |  |  |  | Yes | Global | No |
| [**innodb\_page\_cleaners**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_page_cleaners) | Yes | Yes | Yes |  | Global | No |
| [**Innodb\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_page_size) |  |  |  | Yes | Global | No |
| [**innodb\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_page_size) | Yes | Yes | Yes |  | Global | No |
| [**Innodb\_pages\_created**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_pages_created) |  |  |  | Yes | Global | No |
| [**Innodb\_pages\_read**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_pages_read) |  |  |  | Yes | Global | No |
| [**Innodb\_pages\_written**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_pages_written) |  |  |  | Yes | Global | No |
| [**innodb\_parallel\_read\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_parallel_read_threads) | Yes | Yes | Yes |  | Session | Yes |
| [**innodb\_print\_all\_deadlocks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_print_all_deadlocks) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_print\_ddl\_logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_print_ddl_logs) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_purge\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_batch_size) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_purge\_rseg\_truncate\_frequency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_rseg_truncate_frequency) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_purge\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_threads) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_random\_read\_ahead**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_random_read_ahead) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_read\_ahead\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_ahead_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_read\_io\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_io_threads) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_only) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_redo\_log\_archive\_dirs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_archive_dirs) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_redo\_log\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_redo_log_enabled) |  |  |  | Yes | Global | No |
| [**innodb\_redo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_encrypt) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_replication\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_replication_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_rollback\_on\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_rollback_on_timeout) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_rollback\_segments**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_rollback_segments) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_row\_lock\_current\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_current_waits) |  |  |  | Yes | Global | No |
| [**Innodb\_row\_lock\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_time) |  |  |  | Yes | Global | No |
| [**Innodb\_row\_lock\_time\_avg**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_time_avg) |  |  |  | Yes | Global | No |
| [**Innodb\_row\_lock\_time\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_time_max) |  |  |  | Yes | Global | No |
| [**Innodb\_row\_lock\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_waits) |  |  |  | Yes | Global | No |
| [**Innodb\_rows\_deleted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_deleted) |  |  |  | Yes | Global | No |
| [**Innodb\_rows\_inserted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_inserted) |  |  |  | Yes | Global | No |
| [**Innodb\_rows\_read**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_read) |  |  |  | Yes | Global | No |
| [**Innodb\_rows\_updated**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_updated) |  |  |  | Yes | Global | No |
| [**innodb\_saved\_page\_number\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_saved_page_number_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_segment\_reserve\_factor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_segment_reserve_factor) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sort_buffer_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_spin\_wait\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_spin_wait_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_spin\_wait\_pause\_multiplier**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_spin_wait_pause_multiplier) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_auto\_recalc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_auto_recalc) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_include\_delete\_marked**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_include_delete_marked) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_method) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_on\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_on_metadata) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_persistent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_persistent) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_persistent\_sample\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_persistent_sample_pages) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_stats\_transient\_sample\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_transient_sample_pages) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb-status-file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#option_mysqld_innodb-status-file) | Yes | Yes |  |  |  |  |
| [**innodb\_status\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_status_output) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_status\_output\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_status_output_locks) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_strict\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_strict_mode) | Yes | Yes | Yes |  | Both | Yes |
| [**innodb\_sync\_array\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_array_size) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_sync\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_debug) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_sync\_spin\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_spin_loops) | Yes | Yes | Yes |  | Global | Yes |
| [**Innodb\_system\_rows\_deleted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_system_rows_deleted) |  |  |  | Yes | Global | No |
| [**Innodb\_system\_rows\_inserted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_system_rows_inserted) |  |  |  | Yes | Global | No |
| [**Innodb\_system\_rows\_read**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_system_rows_read) |  |  |  | Yes | Global | No |
| [**innodb\_table\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_table_locks) | Yes | Yes | Yes |  | Both | Yes |
| [**innodb\_temp\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_temp_data_file_path) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_temp\_tablespaces\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_temp_tablespaces_dir) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_thread\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_thread_concurrency) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_thread\_sleep\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_thread_sleep_delay) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_tmpdir) | Yes | Yes | Yes |  | Both | Yes |
| [**Innodb\_truncated\_status\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_truncated_status_writes) |  |  |  | Yes | Global | No |
| [**innodb\_trx\_purge\_view\_update\_only\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_trx_purge_view_update_only_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_trx\_rseg\_n\_slots\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_trx_rseg_n_slots_debug) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_undo\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_directory) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_undo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_encrypt) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_undo\_log\_truncate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_truncate) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_undo\_tablespaces**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_tablespaces) | Yes | Yes | Yes |  | Global | Varies |
| [**Innodb\_undo\_tablespaces\_active**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_active) |  |  |  | Yes | Global | No |
| [**Innodb\_undo\_tablespaces\_explicit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_explicit) |  |  |  | Yes | Global | No |
| [**Innodb\_undo\_tablespaces\_implicit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_implicit) |  |  |  | Yes | Global | No |
| [**Innodb\_undo\_tablespaces\_total**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_total) |  |  |  | Yes | Global | No |
| [**innodb\_use\_fdatasync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_use_fdatasync) | Yes | Yes | Yes |  | Global | Yes |
| [**innodb\_use\_native\_aio**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_use_native_aio) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_validate\_tablespace\_paths**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_validate_tablespace_paths) | Yes | Yes | Yes |  | Global | No |
| [**innodb\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_version) |  |  | Yes |  | Global | No |
| [**innodb\_write\_io\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_write_io_threads) | Yes | Yes | Yes |  | Global | No |
| [**insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_insert_id) |  |  | Yes |  | Session | Yes |
| [**install**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install) | Yes |  |  |  |  |  |
| [**install-manual**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install-manual) | Yes |  |  |  |  |  |
| [**interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_interactive_timeout) | Yes | Yes | Yes |  | Both | Yes |
| [**internal\_tmp\_disk\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_disk_storage_engine) | Yes | Yes | Yes |  | Global | Yes |
| [**internal\_tmp\_mem\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_mem_storage_engine) | Yes | Yes | Yes |  | Both | Yes |
| [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**keep\_files\_on\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_keep_files_on_create) | Yes | Yes | Yes |  | Both | Yes |
| [**Key\_blocks\_not\_flushed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_not_flushed) |  |  |  | Yes | Global | No |
| [**Key\_blocks\_unused**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_unused) |  |  |  | Yes | Global | No |
| [**Key\_blocks\_used**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_used) |  |  |  | Yes | Global | No |
| [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) | Yes | Yes | Yes |  | Global | Yes |
| [**key\_cache\_age\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_age_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**key\_cache\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_block_size) | Yes | Yes | Yes |  | Global | Yes |
| [**key\_cache\_division\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_division_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**Key\_read\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_read_requests) |  |  |  | Yes | Global | No |
| [**Key\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_reads) |  |  |  | Yes | Global | No |
| [**Key\_write\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_write_requests) |  |  |  | Yes | Global | No |
| [**Key\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_writes) |  |  |  | Yes | Global | No |
| [**keyring\_aws\_cmk\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_cmk_id) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_aws\_conf\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_conf_file) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_aws\_data\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_data_file) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_aws\_region**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_region) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_encrypted\_file\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_encrypted_file_data) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_encrypted\_file\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_encrypted_file_password) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_file\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_file_data) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_auth\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_auth_path) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_ca_path) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_caching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_caching) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_commit\_auth\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_auth_path) |  |  | Yes |  | Global | No |
| [**keyring\_hashicorp\_commit\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_ca_path) |  |  | Yes |  | Global | No |
| [**keyring\_hashicorp\_commit\_caching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_caching) |  |  | Yes |  | Global | No |
| [**keyring\_hashicorp\_commit\_role\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_role_id) |  |  | Yes |  | Global | No |
| [**keyring\_hashicorp\_commit\_server\_url**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_server_url) |  |  | Yes |  | Global | No |
| [**keyring\_hashicorp\_commit\_store\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_store_path) |  |  | Yes |  | Global | No |
| [**keyring\_hashicorp\_role\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_role_id) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_secret\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_secret_id) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_server\_url**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_server_url) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_hashicorp\_store\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_store_path) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring-migration-destination**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-destination) | Yes | Yes |  |  |  |  |
| [**keyring-migration-host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-host) | Yes | Yes |  |  |  |  |
| [**keyring-migration-password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-password) | Yes | Yes |  |  |  |  |
| [**keyring-migration-port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-port) | Yes | Yes |  |  |  |  |
| [**keyring-migration-socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-socket) | Yes | Yes |  |  |  |  |
| [**keyring-migration-source**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-source) | Yes | Yes |  |  |  |  |
| [**keyring-migration-to-component**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-to-component) | Yes | Yes |  |  |  |  |
| [**keyring-migration-user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_keyring-migration-user) | Yes | Yes |  |  |  |  |
| [**keyring\_oci\_ca\_certificate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_ca_certificate) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_compartment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_compartment) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_encryption\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_encryption_endpoint) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_key\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_key_file) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_key\_fingerprint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_key_fingerprint) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_management\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_management_endpoint) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_master\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_master_key) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_secrets\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_secrets_endpoint) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_tenancy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_tenancy) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_user) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_vaults\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_vaults_endpoint) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_oci\_virtual\_vault**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_virtual_vault) | Yes | Yes | Yes |  | Global | No |
| [**keyring\_okv\_conf\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_okv_conf_dir) | Yes | Yes | Yes |  | Global | Yes |
| [**keyring\_operations**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_operations) |  |  | Yes |  | Global | Yes |
| [**language**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_language) | Yes | Yes | Yes |  | Global | No |
| [**large\_files\_support**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_files_support) |  |  | Yes |  | Global | No |
| [**large\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_page_size) |  |  | Yes |  | Global | No |
| [**large\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_large-pages) | Yes | Yes | Yes |  | Global | No |
| [**last\_insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_last_insert_id) |  |  | Yes |  | Session | Yes |
| [**Last\_query\_cost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Last_query_cost) |  |  |  | Yes | Session | No |
| [**Last\_query\_partial\_plans**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Last_query_partial_plans) |  |  |  | Yes | Session | No |
| [**lc\_messages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages) | Yes | Yes | Yes |  | Both | Yes |
| [**lc\_messages\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages-dir) | Yes | Yes | Yes |  | Global | No |
| [**lc\_time\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_time_names) | Yes | Yes | Yes |  | Both | Yes |
| [**license**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_license) |  |  | Yes |  | Global | No |
| [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) | Yes | Yes | Yes |  | Global | Yes |
| [**local-service**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_local-service) | Yes |  |  |  |  |  |
| [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_debug\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_loop) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_debug\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_arc) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_debug\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_key) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_debug\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_unlock) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_dependencies) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_extra\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_extra_dependencies) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_output\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_output_directory) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_print\_txt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_print_txt) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_trace\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_loop) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_trace\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_arc) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_trace\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_key) | Yes | Yes | Yes |  | Global | No |
| [**lock\_order\_trace\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_unlock) | Yes | Yes | Yes |  | Global | No |
| [**lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_wait_timeout) | Yes | Yes | Yes |  | Both | Yes |
| [**Locked\_connects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Locked_connects) |  |  |  | Yes | Global | No |
| [**locked\_in\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_locked_in_memory) |  |  | Yes |  | Global | No |
| [**log-bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) | Yes | Yes |  |  |  |  |
| [**log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin) |  |  | Yes |  | Global | No |
| [**log\_bin\_basename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_basename) |  |  | Yes |  | Global | No |
| [**log\_bin\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin-index) | Yes | Yes | Yes |  | Global | No |
| [**log\_bin\_trust\_function\_creators**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_trust_function_creators) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_bin\_use\_v1\_row\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_use_v1_row_events) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) | Yes | Yes | Yes |  | Global | No |
| [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) | Yes | Yes | Yes |  | Global | Yes |
| [**log-isam**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-isam) | Yes | Yes |  |  |  |  |
| [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_raw**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) | Yes | Yes | Yes |  | Global | Yes |
| [**log-short-format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-short-format) | Yes | Yes |  |  |  |  |
| [**log\_slave\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slave_updates) | Yes | Yes | Yes |  | Global | No |
| [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_slow\_extra**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_extra) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_slow\_slave\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slow_slave_statements) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_statements\_unsafe\_for\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_statements_unsafe_for_binlog) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_syslog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_syslog\_facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_facility) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_syslog\_include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_include_pid) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_syslog\_tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_tag) | Yes | Yes | Yes |  | Global | Yes |
| [**log-tc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-tc) | Yes | Yes |  |  |  |  |
| [**log-tc-size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-tc-size) | Yes | Yes |  |  |  |  |
| [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) | Yes | Yes | Yes |  | Global | Yes |
| [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) | Yes | Yes | Yes |  | Global | Yes |
| [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) | Yes | Yes | Yes |  | Both | Yes |
| [**low\_priority\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_low_priority_updates) | Yes | Yes | Yes |  | Both | Yes |
| [**lower\_case\_file\_system**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_file_system) |  |  | Yes |  | Global | No |
| [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) | Yes | Yes | Yes |  | Global | No |
| [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) | Yes | Yes | Yes |  | Global | Yes |
| [**master-info-file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_master-info-file) | Yes | Yes |  |  |  |  |
| [**master\_info\_repository**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_info_repository) | Yes | Yes | Yes |  | Global | Yes |
| [**master-retry-count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_master-retry-count) | Yes | Yes |  |  |  |  |
| [**master\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_verify_checksum) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**max-binlog-dump-events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_max-binlog-dump-events) | Yes | Yes |  |  |  |  |
| [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_stmt_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_delayed_threads) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length) | Yes | Yes | Yes |  | Global | No |
| [**max\_error\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_error_count) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) | Yes | Yes | Yes |  | Both | Yes |
| [**Max\_execution\_time\_exceeded**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_execution_time_exceeded) |  |  |  | Yes | Both | No |
| [**Max\_execution\_time\_set**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_execution_time_set) |  |  |  | Yes | Both | No |
| [**Max\_execution\_time\_set\_failed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_execution_time_set_failed) |  |  |  | Yes | Both | No |
| [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_insert\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_insert_delayed_threads) |  |  | Yes |  | Both | Yes |
| [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_length\_for\_sort\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_length_for_sort_data) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_points\_in\_geometry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_points_in_geometry) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_prepared\_stmt\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_prepared_stmt_count) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_relay\_log\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_relay_log_size) | Yes | Yes | Yes |  | Global | Yes |
| [**max\_seeks\_for\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_seeks_for_key) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_sp\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sp_recursion_depth) | Yes | Yes | Yes |  | Both | Yes |
| [**Max\_used\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_used_connections) |  |  |  | Yes | Global | No |
| [**Max\_used\_connections\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_used_connections_time) |  |  |  | Yes | Global | No |
| [**max\_user\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_user_connections) | Yes | Yes | Yes |  | Both | Yes |
| [**max\_write\_lock\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_write_lock_count) | Yes | Yes | Yes |  | Global | Yes |
| [**mecab\_charset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_mecab_charset) |  |  |  | Yes | Global | No |
| [**mecab\_rc\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mecab_rc_file) | Yes | Yes | Yes |  | Global | No |
| [**memlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_memlock) | Yes | Yes |  |  |  |  |
| - Variable: [**locked\_in\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_locked_in_memory) |  |  |  |  |  |  |
| [**metadata\_locks\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_metadata_locks_cache_size) | Yes | Yes | Yes |  | Global | No |
| [**metadata\_locks\_hash\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_metadata_locks_hash_instances) | Yes | Yes | Yes |  | Global | No |
| [**min\_examined\_row\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_min_examined_row_limit) | Yes | Yes | Yes |  | Both | Yes |
| [**myisam-block-size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_myisam-block-size) | Yes | Yes |  |  |  |  |
| [**myisam\_data\_pointer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_data_pointer_size) | Yes | Yes | Yes |  | Global | Yes |
| [**myisam\_max\_sort\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_max_sort_file_size) | Yes | Yes | Yes |  | Global | Yes |
| [**myisam\_mmap\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_mmap_size) | Yes | Yes | Yes |  | Global | No |
| [**myisam\_recover\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_recover_options) | Yes | Yes | Yes |  | Global | No |
| [**myisam\_repair\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_repair_threads) | Yes | Yes | Yes |  | Both | Yes |
| [**myisam\_sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_sort_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**myisam\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_stats_method) | Yes | Yes | Yes |  | Both | Yes |
| [**myisam\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_use_mmap) | Yes | Yes | Yes |  | Global | Yes |
| [**mysql\_firewall\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_mysql_firewall_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**mysql\_firewall\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_mysql_firewall_trace) | Yes | Yes | Yes |  | Global | Yes |
| [**mysql\_native\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mysql_native_password_proxy_users) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#option_mysqld_mysqlx) | Yes | Yes |  |  |  |  |
| [**Mysqlx\_aborted\_clients**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_aborted_clients) |  |  |  | Yes | Global | No |
| [**Mysqlx\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_address) |  |  |  | Yes | Global | No |
| [**mysqlx\_bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_bind_address) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_bytes\_received**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_received) |  |  |  | Yes | Both | No |
| [**Mysqlx\_bytes\_received\_compressed\_payload**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_received_compressed_payload) |  |  |  | Yes | Both | No |
| [**Mysqlx\_bytes\_received\_uncompressed\_frame**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_received_uncompressed_frame) |  |  |  | Yes | Both | No |
| [**Mysqlx\_bytes\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_sent) |  |  |  | Yes | Both | No |
| [**Mysqlx\_bytes\_sent\_compressed\_payload**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_sent_compressed_payload) |  |  |  | Yes | Both | No |
| [**Mysqlx\_bytes\_sent\_uncompressed\_frame**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_sent_uncompressed_frame) |  |  |  | Yes | Both | No |
| [**Mysqlx\_compression\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_compression_algorithm) |  |  |  | Yes | Session | No |
| [**mysqlx\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_compression_algorithms) | Yes | Yes | Yes |  | Global | Yes |
| [**Mysqlx\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_compression_level) |  |  |  | Yes | Session | No |
| [**mysqlx\_connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_connect_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**Mysqlx\_connection\_accept\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connection_accept_errors) |  |  |  | Yes | Both | No |
| [**Mysqlx\_connection\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connection_errors) |  |  |  | Yes | Both | No |
| [**Mysqlx\_connections\_accepted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connections_accepted) |  |  |  | Yes | Global | No |
| [**Mysqlx\_connections\_closed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connections_closed) |  |  |  | Yes | Global | No |
| [**Mysqlx\_connections\_rejected**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connections_rejected) |  |  |  | Yes | Global | No |
| [**Mysqlx\_crud\_create\_view**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_create_view) |  |  |  | Yes | Both | No |
| [**Mysqlx\_crud\_delete**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_delete) |  |  |  | Yes | Both | No |
| [**Mysqlx\_crud\_drop\_view**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_drop_view) |  |  |  | Yes | Both | No |
| [**Mysqlx\_crud\_find**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_find) |  |  |  | Yes | Both | No |
| [**Mysqlx\_crud\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_insert) |  |  |  | Yes | Both | No |
| [**Mysqlx\_crud\_modify\_view**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_modify_view) |  |  |  | Yes | Both | No |
| [**Mysqlx\_crud\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_update) |  |  |  | Yes | Both | No |
| [**Mysqlx\_cursor\_close**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_cursor_close) |  |  |  | Yes | Both | No |
| [**Mysqlx\_cursor\_fetch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_cursor_fetch) |  |  |  | Yes | Both | No |
| [**Mysqlx\_cursor\_open**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_cursor_open) |  |  |  | Yes | Both | No |
| [**mysqlx\_deflate\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_deflate_default_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_deflate\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_deflate_max_client_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_document\_id\_unique\_prefix**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_document_id_unique_prefix) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_enable\_hello\_notice**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_enable_hello_notice) | Yes | Yes | Yes |  | Global | Yes |
| [**Mysqlx\_errors\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_errors_sent) |  |  |  | Yes | Both | No |
| Mysqlx\_errors\_unknown\_message\_type |  |  |  | Yes | Both | No |
| [**Mysqlx\_expect\_close**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_expect_close) |  |  |  | Yes | Both | No |
| [**Mysqlx\_expect\_open**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_expect_open) |  |  |  | Yes | Both | No |
| [**mysqlx\_idle\_worker\_thread\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_idle_worker_thread_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**Mysqlx\_init\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_init_error) |  |  |  | Yes | Both | No |
| [**mysqlx\_interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_interactive_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_lz4\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_lz4_default_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_lz4\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_lz4_max_client_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_max_allowed_packet) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_max_connections) | Yes | Yes | Yes |  | Global | Yes |
| [**Mysqlx\_messages\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_messages_sent) |  |  |  | Yes | Both | No |
| [**mysqlx\_min\_worker\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_min_worker_threads) | Yes | Yes | Yes |  | Global | Yes |
| [**Mysqlx\_notice\_global\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notice_global_sent) |  |  |  | Yes | Both | No |
| [**Mysqlx\_notice\_other\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notice_other_sent) |  |  |  | Yes | Both | No |
| [**Mysqlx\_notice\_warning\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notice_warning_sent) |  |  |  | Yes | Both | No |
| [**Mysqlx\_notified\_by\_group\_replication**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notified_by_group_replication) |  |  |  | Yes | Both | No |
| [**Mysqlx\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_port) |  |  |  | Yes | Global | No |
| [**mysqlx\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_port) | Yes | Yes | Yes |  | Global | No |
| [**mysqlx\_port\_open\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_port_open_timeout) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_prep\_deallocate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_prep_deallocate) |  |  |  | Yes | Both | No |
| [**Mysqlx\_prep\_execute**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_prep_execute) |  |  |  | Yes | Both | No |
| [**Mysqlx\_prep\_prepare**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_prep_prepare) |  |  |  | Yes | Both | No |
| [**mysqlx\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_read_timeout) | Yes | Yes | Yes |  | Session | Yes |
| [**Mysqlx\_rows\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_rows_sent) |  |  |  | Yes | Both | No |
| [**Mysqlx\_sessions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions) |  |  |  | Yes | Global | No |
| [**Mysqlx\_sessions\_accepted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_accepted) |  |  |  | Yes | Global | No |
| [**Mysqlx\_sessions\_closed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_closed) |  |  |  | Yes | Global | No |
| [**Mysqlx\_sessions\_fatal\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_fatal_error) |  |  |  | Yes | Global | No |
| [**Mysqlx\_sessions\_killed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_killed) |  |  |  | Yes | Global | No |
| [**Mysqlx\_sessions\_rejected**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_rejected) |  |  |  | Yes | Global | No |
| [**Mysqlx\_socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_socket) |  |  |  | Yes | Global | No |
| [**mysqlx\_socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_socket) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_ssl\_accept\_renegotiates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_accept_renegotiates) |  |  |  | Yes | Global | No |
| [**Mysqlx\_ssl\_accepts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_accepts) |  |  |  | Yes | Global | No |
| [**Mysqlx\_ssl\_active**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_active) |  |  |  | Yes | Both | No |
| [**mysqlx\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_ca) | Yes | Yes | Yes |  | Global | No |
| [**mysqlx\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_capath) | Yes | Yes | Yes |  | Global | No |
| [**mysqlx\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_cert) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_cipher) |  |  |  | Yes | Both | No |
| [**mysqlx\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_cipher) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_ssl\_cipher\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_cipher_list) |  |  |  | Yes | Both | No |
| [**mysqlx\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_crl) | Yes | Yes | Yes |  | Global | No |
| [**mysqlx\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_crlpath) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_ssl\_ctx\_verify\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_ctx_verify_depth) |  |  |  | Yes | Both | No |
| [**Mysqlx\_ssl\_ctx\_verify\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_ctx_verify_mode) |  |  |  | Yes | Both | No |
| [**Mysqlx\_ssl\_finished\_accepts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_finished_accepts) |  |  |  | Yes | Global | No |
| [**mysqlx\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_key) | Yes | Yes | Yes |  | Global | No |
| [**Mysqlx\_ssl\_server\_not\_after**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_server_not_after) |  |  |  | Yes | Global | No |
| [**Mysqlx\_ssl\_server\_not\_before**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_server_not_before) |  |  |  | Yes | Global | No |
| [**Mysqlx\_ssl\_verify\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_verify_depth) |  |  |  | Yes | Global | No |
| [**Mysqlx\_ssl\_verify\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_verify_mode) |  |  |  | Yes | Global | No |
| [**Mysqlx\_ssl\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_version) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_create\_collection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_create_collection) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_create\_collection\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_create_collection_index) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_disable\_notices**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_disable_notices) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_drop\_collection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_drop_collection) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_drop\_collection\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_drop_collection_index) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_enable\_notices**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_enable_notices) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_ensure\_collection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_ensure_collection) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_execute\_mysqlx**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_execute_mysqlx) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_execute\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_execute_sql) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_execute\_xplugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_execute_xplugin) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_get\_collection\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_get_collection_options) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_kill\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_kill_client) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_list\_clients**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_list_clients) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_list\_notices**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_list_notices) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_list\_objects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_list_objects) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_modify\_collection\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_modify_collection_options) |  |  |  | Yes | Both | No |
| [**Mysqlx\_stmt\_ping**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_ping) |  |  |  | Yes | Both | No |
| [**mysqlx\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_wait_timeout) | Yes | Yes | Yes |  | Session | Yes |
| [**Mysqlx\_worker\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_worker_threads) |  |  |  | Yes | Global | No |
| [**Mysqlx\_worker\_threads\_active**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_worker_threads_active) |  |  |  | Yes | Global | No |
| [**mysqlx\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_write_timeout) | Yes | Yes | Yes |  | Session | Yes |
| [**mysqlx\_zstd\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_zstd_default_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**mysqlx\_zstd\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_zstd_max_client_compression_level) | Yes | Yes | Yes |  | Global | Yes |
| [**named\_pipe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe) | Yes | Yes | Yes |  | Global | No |
| [**named\_pipe\_full\_access\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe_full_access_group) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_allow\_copying\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-allow-copying-alter-table) | Yes | Yes | Yes |  | Both | Yes |
| [**Ndb\_api\_adaptive\_send\_deferred\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_deferred\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_deferred\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count_session) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_deferred\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_forced\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_forced\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_forced\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count_session) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_forced\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_unforced\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_unforced\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_unforced\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count_session) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_adaptive\_send\_unforced\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_bytes\_received\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_bytes\_received\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_bytes\_received\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_bytes\_received\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_bytes\_sent\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_bytes\_sent\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_bytes\_sent\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_bytes\_sent\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_event\_bytes\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_bytes_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_event\_bytes\_count\_injector**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_bytes_count_injector) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_event\_data\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_data_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_event\_data\_count\_injector**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_data_count_injector) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_event\_nondata\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_nondata_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_event\_nondata\_count\_injector**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_nondata_count_injector) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_pk\_op\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_pk\_op\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_pk\_op\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_pk\_op\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_pruned\_scan\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_pruned\_scan\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_pruned\_scan\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_pruned\_scan\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_range\_scan\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_range\_scan\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_range\_scan\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_range\_scan\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_read\_row\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_read\_row\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_read\_row\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_read\_row\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_scan\_batch\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_scan\_batch\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_scan\_batch\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_scan\_batch\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_table\_scan\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_table\_scan\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_table\_scan\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_table\_scan\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_abort\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_abort\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_abort\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_trans\_abort\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_close\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_close\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_close\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_trans\_close\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_commit\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_commit\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_commit\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_trans\_commit\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_local\_read\_row\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_local\_read\_row\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_local\_read\_row\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_trans\_local\_read\_row\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_start\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_start\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_trans\_start\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_trans\_start\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_uk\_op\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_uk\_op\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_uk\_op\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_uk\_op\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_exec\_complete\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_exec\_complete\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_exec\_complete\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_wait\_exec\_complete\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_meta\_request\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_meta\_request\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_meta\_request\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_wait\_meta\_request\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_nanos\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_nanos\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_nanos\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_wait\_nanos\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count_slave) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_scan\_result\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_scan\_result\_count\_replica**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count_replica) |  |  |  | Yes | Global | No |
| [**Ndb\_api\_wait\_scan\_result\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count_session) |  |  |  | Yes | Session | No |
| [**Ndb\_api\_wait\_scan\_result\_count\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count_slave) |  |  |  | Yes | Global | No |
| [**ndb\_autoincrement\_prefetch\_sz**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_autoincrement_prefetch_sz) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-batch-size) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_blob\_read\_batch\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-blob-read-batch-bytes) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_blob\_write\_batch\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-blob-write-batch-bytes) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_cache\_check\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_cache_check_time) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_clear\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_clear_apply_status) | Yes |  | Yes |  | Global | Yes |
| [**ndb\_cluster\_connection\_pool**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-cluster-connection-pool) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_cluster\_connection\_pool\_nodeids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-cluster-connection-pool-nodeids) | Yes | Yes | Yes |  | Global | No |
| [**Ndb\_cluster\_node\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_cluster_node_id) |  |  |  | Yes | Global | No |
| [**Ndb\_config\_from\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_config_from_host) |  |  |  | Yes | Both | No |
| [**Ndb\_config\_from\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_config_from_port) |  |  |  | Yes | Both | No |
| [**Ndb\_config\_generation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_config_generation) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_fn\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_fn\_epoch\_trans**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch_trans) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_fn\_epoch2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch2) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_fn\_epoch2\_trans**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch2_trans) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_fn\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_max) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_fn\_old**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_old) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_last\_conflict\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_last_conflict_epoch) |  |  | Yes |  | Global | No |
| [**Ndb\_conflict\_last\_stable\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_last_stable_epoch) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_reflected\_op\_discard\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_reflected_op_discard_count) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_reflected\_op\_prepare\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_reflected_op_prepare_count) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_refresh\_op\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_refresh_op_count) |  |  |  | Yes | Global | No |
| [**ndb\_conflict\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_conflict_role) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_conflict\_trans\_conflict\_commit\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_conflict_commit_count) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_trans\_detect\_iter\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_detect_iter_count) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_trans\_reject\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_reject_count) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_trans\_row\_conflict\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_row_conflict_count) |  |  |  | Yes | Global | No |
| [**Ndb\_conflict\_trans\_row\_reject\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_row_reject_count) |  |  |  | Yes | Global | No |
| [**ndb-connectstring**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-connectstring) | Yes | Yes |  |  |  |  |
| [**ndb\_data\_node\_neighbour**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_data_node_neighbour) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_dbg\_check\_shares**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_dbg_check_shares) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_default\_column\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-default-column-format) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_default\_column\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_default_column_format) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_deferred\_constraints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-deferred-constraints) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_deferred\_constraints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_deferred_constraints) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_distribution**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-distribution) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_distribution**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_distribution) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_epoch\_delete\_delete\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_epoch_delete_delete_count) |  |  |  | Yes | Global | No |
| [**ndb\_eventbuffer\_free\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_eventbuffer_free_percent) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_eventbuffer\_max\_alloc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_eventbuffer_max_alloc) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_execute\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_execute_count) |  |  |  | Yes | Global | No |
| [**ndb\_extra\_logging**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_extra_logging) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_force\_send**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_force_send) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_fully\_replicated**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_fully_replicated) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_index\_stat\_enable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_index_stat_enable) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_index\_stat\_option**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_index_stat_option) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_join\_pushdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_join_pushdown) |  |  | Yes |  | Both | Yes |
| [**Ndb\_last\_commit\_epoch\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_last_commit_epoch_server) |  |  |  | Yes | Global | No |
| [**Ndb\_last\_commit\_epoch\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_last_commit_epoch_session) |  |  |  | Yes | Session | No |
| [**ndb\_log\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-apply-status) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_log\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_apply_status) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_bin) | Yes |  | Yes |  | Both | No |
| [**ndb\_log\_binlog\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_binlog_index) | Yes |  | Yes |  | Global | Yes |
| [**ndb\_log\_empty\_epochs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-empty-epochs) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_log\_empty\_epochs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_epochs) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_log\_empty\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-empty-update) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_log\_empty\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_update) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_log\_exclusive\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-exclusive-reads) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_log\_exclusive\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_exclusive_reads) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_log\_fail\_terminate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-fail-terminate) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_log\_orig**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-orig) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_log\_orig**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_orig) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_log\_transaction\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-transaction-id) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_log\_transaction\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_transaction_id) |  |  | Yes |  | Global | No |
| [**ndb\_log\_update\_as\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-update-as-write) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_log\_update\_minimal**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-update-minimal) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_log\_updated\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-updated-only) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_metadata\_blacklist\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_excluded_count) |  |  |  | Yes | Global | No |
| [**ndb\_metadata\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_check) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_metadata\_check\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_check_interval) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_metadata\_detected\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_detected_count) |  |  |  | Yes | Global | No |
| [**Ndb\_metadata\_excluded\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_excluded_count) |  |  |  | Yes | Global | No |
| [**ndb\_metadata\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_sync) |  |  | Yes |  | Global | Yes |
| [**Ndb\_metadata\_synced\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_synced_count) |  |  |  | Yes | Global | No |
| [**ndb-mgmd-host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-mgmd-host) | Yes | Yes |  |  |  |  |
| [**ndb\_nodeid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-nodeid) | Yes | Yes |  | Yes | Global | No |
| [**Ndb\_number\_of\_data\_nodes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_number_of_data_nodes) |  |  |  | Yes | Global | No |
| [**ndb\_optimization\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-optimization-delay) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb-optimized-node-selection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-optimized-node-selection) | Yes |  |  |  |  |  |
| [**ndb\_optimized\_node\_selection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_optimized_node_selection) | Yes | Yes | Yes |  | Global | No |
| [**Ndb\_pruned\_scan\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pruned_scan_count) |  |  |  | Yes | Global | No |
| [**Ndb\_pushed\_queries\_defined**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_queries_defined) |  |  |  | Yes | Global | No |
| [**Ndb\_pushed\_queries\_dropped**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_queries_dropped) |  |  |  | Yes | Global | No |
| [**Ndb\_pushed\_queries\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_queries_executed) |  |  |  | Yes | Global | No |
| [**Ndb\_pushed\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_reads) |  |  |  | Yes | Global | No |
| [**ndb\_read\_backup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_read_backup) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_recv\_thread\_activation\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_recv_thread_activation_threshold) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_recv\_thread\_cpu\_mask**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_recv_thread_cpu_mask) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_replica\_max\_replicated\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_replica_max_replicated_epoch) |  |  | Yes |  | Global | No |
| [**ndb\_report\_thresh\_binlog\_epoch\_slip**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_report_thresh_binlog_epoch_slip) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_report\_thresh\_binlog\_mem\_usage**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_report_thresh_binlog_mem_usage) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_row\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_row_checksum) |  |  | Yes |  | Both | Yes |
| [**Ndb\_scan\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_scan_count) |  |  |  | Yes | Global | No |
| [**ndb\_schema\_dist\_lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_lock_wait_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_schema\_dist\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-schema-dist-timeout) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_schema\_dist\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_timeout) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_schema\_dist\_upgrade\_allowed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_upgrade_allowed) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_show\_foreign\_key\_mock\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_show_foreign_key_mock_tables) | Yes | Yes | Yes |  | Global | Yes |
| [**ndb\_slave\_conflict\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_slave_conflict_role) | Yes | Yes | Yes |  | Global | Yes |
| [**Ndb\_slave\_max\_replicated\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_slave_max_replicated_epoch) |  |  | Yes |  | Global | No |
| [**Ndb\_system\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_system_name) |  |  | Yes |  | Global | No |
| [**ndb\_table\_no\_logging**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_table_no_logging) |  |  | Yes |  | Session | Yes |
| [**ndb\_table\_temporary**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_table_temporary) |  |  | Yes |  | Session | Yes |
| [**Ndb\_trans\_hint\_count\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_trans_hint_count_session) |  |  |  | Yes | Both | No |
| [**ndb-transid-mysql-connection-map**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-transid-mysql-connection-map) | Yes |  |  |  |  |  |
| [**ndb\_use\_copying\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_copying_alter_table) |  |  | Yes |  | Both | No |
| [**ndb\_use\_exact\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_exact_count) |  |  | Yes |  | Both | Yes |
| [**ndb\_use\_transactions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_transactions) | Yes | Yes | Yes |  | Both | Yes |
| [**ndb\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_version) |  |  | Yes |  | Global | No |
| [**ndb\_version\_string**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_version_string) |  |  | Yes |  | Global | No |
| [**ndb\_wait\_connected**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-wait-connected) | Yes | Yes | Yes |  | Global | No |
| [**ndb\_wait\_setup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-wait-setup) | Yes | Yes | Yes |  | Global | No |
| [**ndbcluster**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndbcluster) | Yes | Yes |  |  |  |  |
| [**ndbinfo**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndbinfo) | Yes |  |  |  |  |  |
| [**ndbinfo\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_database) |  |  | Yes |  | Global | No |
| [**ndbinfo\_max\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_max_bytes) | Yes |  | Yes |  | Both | Yes |
| [**ndbinfo\_max\_rows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_max_rows) | Yes |  | Yes |  | Both | Yes |
| [**ndbinfo\_offline**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_offline) |  |  | Yes |  | Global | Yes |
| [**ndbinfo\_show\_hidden**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_show_hidden) | Yes |  | Yes |  | Both | Yes |
| [**ndbinfo\_table\_prefix**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_table_prefix) |  |  | Yes |  | Global | No |
| [**ndbinfo\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_version) |  |  | Yes |  | Global | No |
| [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) | Yes | Yes | Yes |  | Both | Yes |
| [**net\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_read_timeout) | Yes | Yes | Yes |  | Both | Yes |
| [**net\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_retry_count) | Yes | Yes | Yes |  | Both | Yes |
| [**net\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_write_timeout) | Yes | Yes | Yes |  | Both | Yes |
| [**new**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_new) | Yes | Yes | Yes |  | Both | Yes |
| [**ngram\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ngram_token_size) | Yes | Yes | Yes |  | Global | No |
| [**no-dd-upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-dd-upgrade) | Yes | Yes |  |  |  |  |
| [**no-defaults**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-defaults) | Yes |  |  |  |  |  |
| [**no-monitor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-monitor) | Yes | Yes |  |  |  |  |
| [**Not\_flushed\_delayed\_rows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Not_flushed_delayed_rows) |  |  |  | Yes | Global | No |
| [**offline\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_offline_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**old**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old) | Yes | Yes | Yes |  | Global | No |
| [**old\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old_alter_table) | Yes | Yes | Yes |  | Both | Yes |
| [**old-style-user-limits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_old-style-user-limits) | Yes | Yes |  |  |  |  |
| [**Ongoing\_anonymous\_gtid\_violating\_transaction\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ongoing_anonymous_gtid_violating_transaction_count) |  |  |  | Yes | Global | No |
| [**Ongoing\_anonymous\_transaction\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ongoing_anonymous_transaction_count) |  |  |  | Yes | Global | No |
| [**Ongoing\_automatic\_gtid\_violating\_transaction\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ongoing_automatic_gtid_violating_transaction_count) |  |  |  | Yes | Global | No |
| [**Open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_files) |  |  |  | Yes | Global | No |
| [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) | Yes | Yes | Yes |  | Global | No |
| [**Open\_streams**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_streams) |  |  |  | Yes | Global | No |
| [**Open\_table\_definitions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_table_definitions) |  |  |  | Yes | Global | No |
| [**Open\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_tables) |  |  |  | Yes | Both | No |
| [**Opened\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_files) |  |  |  | Yes | Global | No |
| [**Opened\_table\_definitions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_table_definitions) |  |  |  | Yes | Both | No |
| [**Opened\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_tables) |  |  |  | Yes | Both | No |
| [**optimizer\_prune\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_prune_level) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_search\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_search_depth) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_switch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_switch) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_trace\_features**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_features) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_trace\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_limit) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_trace\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_max_mem_size) | Yes | Yes | Yes |  | Both | Yes |
| [**optimizer\_trace\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_offset) | Yes | Yes | Yes |  | Both | Yes |
| [**original\_commit\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_commit_timestamp) |  |  | Yes |  | Session | Yes |
| [**original\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_server_version) |  |  | Yes |  | Session | Yes |
| [**parser\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_parser_max_mem_size) | Yes | Yes | Yes |  | Both | Yes |
| [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) | Yes | Yes | Yes |  | Global | Yes |
| [**password\_history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_history) | Yes | Yes | Yes |  | Global | Yes |
| [**password\_require\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_require_current) | Yes | Yes | Yes |  | Global | Yes |
| [**password\_reuse\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_reuse_interval) | Yes | Yes | Yes |  | Global | Yes |
| [**performance\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema) | Yes | Yes | Yes |  | Global | No |
| [**Performance\_schema\_accounts\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_accounts_lost) |  |  |  | Yes | Global | No |
| [**performance\_schema\_accounts\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_accounts_size) | Yes | Yes | Yes |  | Global | No |
| [**Performance\_schema\_cond\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_cond_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_cond\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_cond_instances_lost) |  |  |  | Yes | Global | No |
| [**performance-schema-consumer-events-stages-current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-stages-current) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-stages-history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-stages-history) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-stages-history-long**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-stages-history-long) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-statements-current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-statements-current) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-statements-history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-statements-history) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-statements-history-long**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-statements-history-long) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-transactions-current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-transactions-current) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-transactions-history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-transactions-history) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-transactions-history-long**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-transactions-history-long) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-waits-current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-waits-current) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-waits-history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-waits-history) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-events-waits-history-long**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-events-waits-history-long) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-global-instrumentation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-global-instrumentation) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-statements-digest**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-statements-digest) | Yes | Yes |  |  |  |  |
| [**performance-schema-consumer-thread-instrumentation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-consumer-thread-instrumentation) | Yes | Yes |  |  |  |  |
| [**Performance\_schema\_digest\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_digest_lost) |  |  |  | Yes | Global | No |
| [**performance\_schema\_digests\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_digests_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_error\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_error_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_stages\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_stages_history_long_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_stages\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_stages_history_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_statements\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_statements_history_long_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_statements\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_statements_history_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_transactions\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_transactions_history_long_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_transactions\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_transactions_history_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_waits\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_waits_history_long_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_events\_waits\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_waits_history_size) | Yes | Yes | Yes |  | Global | No |
| [**Performance\_schema\_file\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_file_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_file\_handles\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_file_handles_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_file\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_file_instances_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_hosts\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_hosts_lost) |  |  |  | Yes | Global | No |
| [**performance\_schema\_hosts\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_hosts_size) | Yes | Yes | Yes |  | Global | No |
| [**Performance\_schema\_index\_stat\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_index_stat_lost) |  |  |  | Yes | Global | No |
| [**performance-schema-instrument**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#option_mysqld_performance-schema-instrument) | Yes | Yes |  |  |  |  |
| [**Performance\_schema\_locker\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_locker_lost) |  |  |  | Yes | Global | No |
| [**performance\_schema\_max\_cond\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_cond_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_cond\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_cond_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_length) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_digest\_sample\_age**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_sample_age) | Yes | Yes | Yes |  | Global | Yes |
| [**performance\_schema\_max\_file\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_file_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_file\_handles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_file_handles) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_file\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_file_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_index\_stat**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_index_stat) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_memory\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_memory_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_metadata\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_metadata_locks) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_mutex\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_mutex_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_mutex\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_mutex_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_prepared\_statements\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_prepared_statements_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_program\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_program_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_rwlock\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_rwlock_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_rwlock\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_rwlock_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_socket\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_socket_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_socket\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_socket_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_sql\_text\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_sql_text_length) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_stage\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_stage_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_statement\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_statement_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_statement\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_statement_stack) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_table\_handles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_table_handles) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_table\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_table_instances) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_table\_lock\_stat**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_table_lock_stat) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_thread\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_thread_classes) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_max\_thread\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_thread_instances) | Yes | Yes | Yes |  | Global | No |
| [**Performance\_schema\_memory\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_memory_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_metadata\_lock\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_metadata_lock_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_mutex\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_mutex_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_mutex\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_mutex_instances_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_nested\_statement\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_nested_statement_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_prepared\_statements\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_prepared_statements_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_program\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_program_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_rwlock\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_rwlock_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_rwlock\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_rwlock_instances_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_session\_connect\_attrs\_longest\_seen**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_session_connect_attrs_longest_seen) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_session\_connect\_attrs\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_session_connect_attrs_lost) |  |  |  | Yes | Global | No |
| [**performance\_schema\_session\_connect\_attrs\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_session_connect_attrs_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_setup\_actors\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_setup_actors_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_setup\_objects\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_setup_objects_size) | Yes | Yes | Yes |  | Global | No |
| [**performance\_schema\_show\_processlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_show_processlist) | Yes | Yes | Yes |  | Global | Yes |
| [**Performance\_schema\_socket\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_socket_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_socket\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_socket_instances_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_stage\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_stage_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_statement\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_statement_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_table\_handles\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_table_handles_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_table\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_table_instances_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_table\_lock\_stat\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_table_lock_stat_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_thread\_classes\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_thread_classes_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_thread\_instances\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_thread_instances_lost) |  |  |  | Yes | Global | No |
| [**Performance\_schema\_users\_lost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_users_lost) |  |  |  | Yes | Global | No |
| [**performance\_schema\_users\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_users_size) | Yes | Yes | Yes |  | Global | No |
| [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) | Yes | Yes | Yes |  | Global | No |
| [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load) | Yes | Yes | Yes |  | Global | No |
| [**pid\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file) | Yes | Yes | Yes |  | Global | No |
| [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) | Yes | Yes | Yes |  | Global | No |
| [**plugin\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) | Yes | Yes | Yes |  | Global | No |
| [**plugin\_load\_add**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) | Yes | Yes | Yes |  | Global | No |
| [**plugin-xxx**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-xxx) | Yes | Yes |  |  |  |  |
| [**port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_port) | Yes | Yes | Yes |  | Global | No |
| [**port-open-timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_port-open-timeout) | Yes | Yes |  |  |  |  |
| [**preload\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_preload_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**Prepared\_stmt\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Prepared_stmt_count) |  |  |  | Yes | Global | No |
| [**print-defaults**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_print-defaults) | Yes |  |  |  |  |  |
| [**print\_identified\_with\_as\_hex**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_print_identified_with_as_hex) | Yes | Yes | Yes |  | Both | Yes |
| [**profiling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling) |  |  | Yes |  | Both | Yes |
| [**profiling\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling_history_size) | Yes | Yes | Yes |  | Both | Yes |
| [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) | Yes | Yes | Yes |  | Global | Yes |
| [**protocol\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_version) |  |  | Yes |  | Global | No |
| [**proxy\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_proxy_user) |  |  | Yes |  | Session | No |
| [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) |  |  | Yes |  | Session | Yes |
| [**pseudo\_thread\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_thread_id) |  |  | Yes |  | Session | Yes |
| [**Queries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Queries) |  |  |  | Yes | Both | No |
| [**query\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_alloc_block_size) | Yes | Yes | Yes |  | Both | Yes |
| [**query\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_prealloc_size) | Yes | Yes | Yes |  | Both | Yes |
| [**Questions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Questions) |  |  |  | Yes | Both | No |
| [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1) |  |  | Yes |  | Session | Yes |
| [**rand\_seed2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed2) |  |  | Yes |  | Session | Yes |
| [**range\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_alloc_block_size) | Yes | Yes | Yes |  | Both | Yes |
| [**range\_optimizer\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_optimizer_max_mem_size) | Yes | Yes | Yes |  | Both | Yes |
| [**rbr\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rbr_exec_mode) |  |  | Yes |  | Both | Yes |
| [**read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) | Yes | Yes | Yes |  | Global | Yes |
| [**read\_rnd\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_rnd_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**regexp\_stack\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_stack_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**regexp\_time\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_time_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**relay\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log) | Yes | Yes | Yes |  | Global | No |
| [**relay\_log\_basename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_basename) |  |  | Yes |  | Global | No |
| [**relay\_log\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_index) | Yes | Yes | Yes |  | Global | No |
| [**relay\_log\_info\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_info_file) | Yes | Yes | Yes |  | Global | No |
| [**relay\_log\_info\_repository**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_info_repository) | Yes | Yes | Yes |  | Global | Yes |
| [**relay\_log\_purge**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_purge) | Yes | Yes | Yes |  | Global | Yes |
| [**relay\_log\_recovery**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_recovery) | Yes | Yes | Yes |  | Global | No |
| [**relay\_log\_space\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_space_limit) | Yes | Yes | Yes |  | Global | No |
| [**remove**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_remove) | Yes |  |  |  |  |  |
| [**replicate-do-db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-do-db) | Yes | Yes |  |  |  |  |
| [**replicate-do-table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-do-table) | Yes | Yes |  |  |  |  |
| [**replicate-ignore-db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-ignore-db) | Yes | Yes |  |  |  |  |
| [**replicate-ignore-table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-ignore-table) | Yes | Yes |  |  |  |  |
| [**replicate-rewrite-db**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-rewrite-db) | Yes | Yes |  |  |  |  |
| [**replicate-same-server-id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-same-server-id) | Yes | Yes |  |  |  |  |
| [**replicate-wild-do-table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-wild-do-table) | Yes | Yes |  |  |  |  |
| [**replicate-wild-ignore-table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-wild-ignore-table) | Yes | Yes |  |  |  |  |
| [**replication\_optimize\_for\_static\_plugin\_config**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_replication_optimize_for_static_plugin_config) | Yes | Yes | Yes |  | Global | Yes |
| [**replication\_sender\_observe\_commit\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_replication_sender_observe_commit_only) | Yes | Yes | Yes |  | Global | Yes |
| [**report\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_host) | Yes | Yes | Yes |  | Global | No |
| [**report\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_password) | Yes | Yes | Yes |  | Global | No |
| [**report\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_port) | Yes | Yes | Yes |  | Global | No |
| [**report\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_user) | Yes | Yes | Yes |  | Global | No |
| [**require\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_row_format) |  |  | Yes |  | Session | Yes |
| [**require\_secure\_transport**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_secure_transport) | Yes | Yes | Yes |  | Global | Yes |
| [**resultset\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_resultset_metadata) |  |  | Yes |  | Session | Yes |
| [**rewriter\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_enabled) |  |  | Yes |  | Global | Yes |
| [**Rewriter\_number\_loaded\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_number_loaded_rules) |  |  |  | Yes | Global | No |
| [**Rewriter\_number\_reloads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_number_reloads) |  |  |  | Yes | Global | No |
| [**Rewriter\_number\_rewritten\_queries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_number_rewritten_queries) |  |  |  | Yes | Global | No |
| [**Rewriter\_reload\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_reload_error) |  |  |  | Yes | Global | No |
| [**rewriter\_verbose**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_verbose) |  |  | Yes |  | Global | Yes |
| [**rpl\_read\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_read_size) | Yes | Yes | Yes |  | Global | Yes |
| [**Rpl\_semi\_sync\_master\_clients**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_clients) |  |  |  | Yes | Global | No |
| [**rpl\_semi\_sync\_master\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_enabled) | Yes | Yes | Yes |  | Global | Yes |
| [**Rpl\_semi\_sync\_master\_net\_avg\_wait\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_net_avg_wait_time) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_net\_wait\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_net_wait_time) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_net\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_net_waits) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_no\_times**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_no_times) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_no\_tx**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_no_tx) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_status) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_timefunc\_failures**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_timefunc_failures) |  |  |  | Yes | Global | No |
| [**rpl\_semi\_sync\_master\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**rpl\_semi\_sync\_master\_trace\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_trace_level) | Yes | Yes | Yes |  | Global | Yes |
| [**Rpl\_semi\_sync\_master\_tx\_avg\_wait\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_tx_avg_wait_time) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_tx\_wait\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_tx_wait_time) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_tx\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_tx_waits) |  |  |  | Yes | Global | No |
| [**rpl\_semi\_sync\_master\_wait\_for\_slave\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_for_slave_count) | Yes | Yes | Yes |  | Global | Yes |
| [**rpl\_semi\_sync\_master\_wait\_no\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_no_slave) | Yes | Yes | Yes |  | Global | Yes |
| [**rpl\_semi\_sync\_master\_wait\_point**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_point) | Yes | Yes | Yes |  | Global | Yes |
| [**Rpl\_semi\_sync\_master\_wait\_pos\_backtraverse**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_wait_pos_backtraverse) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_wait\_sessions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_wait_sessions) |  |  |  | Yes | Global | No |
| [**Rpl\_semi\_sync\_master\_yes\_tx**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_yes_tx) |  |  |  | Yes | Global | No |
| [**rpl\_semi\_sync\_slave\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_slave_enabled) | Yes | Yes | Yes |  | Global | Yes |
| [**Rpl\_semi\_sync\_slave\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_slave_status) |  |  |  | Yes | Global | No |
| [**rpl\_semi\_sync\_slave\_trace\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_slave_trace_level) | Yes | Yes | Yes |  | Global | Yes |
| [**rpl\_stop\_slave\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_stop_slave_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**Rsa\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rsa_public_key) |  |  |  | Yes | Global | No |
| [**safe-user-create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_safe-user-create) | Yes | Yes |  |  |  |  |
| [**schema\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_schema_definition_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**secondary\_engine\_cost\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secondary_engine_cost_threshold) |  |  | Yes |  | Session | Yes |
| [**Secondary\_engine\_execution\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Secondary_engine_execution_count) |  |  |  | Yes | Both | No |
| [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) | Yes | Yes | Yes |  | Global | No |
| [**Select\_full\_join**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_full_join) |  |  |  | Yes | Both | No |
| [**Select\_full\_range\_join**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_full_range_join) |  |  |  | Yes | Both | No |
| [**select\_into\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**select\_into\_disk\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync) | Yes | Yes | Yes |  | Both | Yes |
| [**select\_into\_disk\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync_delay) | Yes | Yes | Yes |  | Both | Yes |
| [**Select\_range**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_range) |  |  |  | Yes | Both | No |
| [**Select\_range\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_range_check) |  |  |  | Yes | Both | No |
| [**Select\_scan**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_scan) |  |  |  | Yes | Both | No |
| [**server\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_id) | Yes | Yes | Yes |  | Global | Yes |
| [**server\_id\_bits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_server_id_bits) | Yes | Yes | Yes |  | Global | No |
| [**server\_uuid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_uuid) |  |  | Yes |  | Global | No |
| [**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) | Yes | Yes | Yes |  | Both | Yes |
| [**session\_track\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_schema) | Yes | Yes | Yes |  | Both | Yes |
| [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) | Yes | Yes | Yes |  | Both | Yes |
| [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) | Yes | Yes | Yes |  | Both | Yes |
| [**session\_track\_transaction\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_transaction_info) | Yes | Yes | Yes |  | Both | Yes |
| [**sha256\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_auto_generate_rsa_keys) | Yes | Yes | Yes |  | Global | No |
| [**sha256\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_private_key_path) | Yes | Yes | Yes |  | Global | No |
| [**sha256\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_proxy_users) | Yes | Yes | Yes |  | Global | Yes |
| [**sha256\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_public_key_path) | Yes | Yes | Yes |  | Global | No |
| [**shared\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory) | Yes | Yes | Yes |  | Global | No |
| [**shared\_memory\_base\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory_base_name) | Yes | Yes | Yes |  | Global | No |
| [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) | Yes | Yes | Yes |  | Session | Yes |
| [**show\_create\_table\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_verbosity) | Yes | Yes | Yes |  | Both | Yes |
| [**show\_old\_temporals**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_old_temporals) | Yes | Yes | Yes |  | Both | Yes |
| [**show-slave-auth-info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_show-slave-auth-info) | Yes | Yes |  |  |  |  |
| [**skip-character-set-client-handshake**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_character-set-client-handshake) | Yes | Yes |  |  |  |  |
| [**skip\_external\_locking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_external_locking) | Yes | Yes | Yes |  | Global | No |
| [**skip-grant-tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) | Yes | Yes |  |  |  |  |
| [**skip-host-cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) | Yes | Yes |  |  |  |  |
| [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) | Yes | Yes | Yes |  | Global | No |
| [**skip-ndbcluster**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_skip-ndbcluster) | Yes | Yes |  |  |  |  |
| [**skip\_networking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_networking) | Yes | Yes | Yes |  | Global | No |
| [**skip-new**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-new) | Yes | Yes |  |  |  |  |
| [**skip\_show\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-show-database) | Yes | Yes | Yes |  | Global | No |
| [**skip\_slave\_start**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_skip-slave-start) | Yes | Yes | Yes |  | Global | No |
| [**skip-ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) | Yes | Yes |  |  |  |  |
| [**skip-stack-trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-stack-trace) | Yes | Yes |  |  |  |  |
| [**slave\_allow\_batching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_slave_allow_batching) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_checkpoint\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_checkpoint_group) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_checkpoint\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_checkpoint_period) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_compressed\_protocol**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_compressed_protocol) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_exec_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_load\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_load_tmpdir) | Yes | Yes | Yes |  | Global | No |
| [**slave\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_max_allowed_packet) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_net\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_net_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**Slave\_open\_temp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slave_open_temp_tables) |  |  |  | Yes | Global | No |
| [**slave\_parallel\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_type) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_parallel\_workers**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_workers) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_pending\_jobs\_size\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_pending_jobs_size_max) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_preserve\_commit\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_preserve_commit_order) | Yes | Yes | Yes |  | Global | Yes |
| [**Slave\_rows\_last\_search\_algorithm\_used**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slave_rows_last_search_algorithm_used) |  |  |  | Yes | Global | No |
| [**slave\_rows\_search\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_rows_search_algorithms) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_skip\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_slave-skip-errors) | Yes | Yes | Yes |  | Global | No |
| [**slave-sql-verify-checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_slave-sql-verify-checksum) | Yes | Yes |  |  |  |  |
| [**slave\_sql\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_sql_verify_checksum) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_transaction\_retries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_transaction_retries) | Yes | Yes | Yes |  | Global | Yes |
| [**slave\_type\_conversions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_type_conversions) | Yes | Yes | Yes |  | Global | Yes |
| [**Slow\_launch\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slow_launch_threads) |  |  |  | Yes | Both | No |
| [**slow\_launch\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_launch_time) | Yes | Yes | Yes |  | Global | Yes |
| [**Slow\_queries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slow_queries) |  |  |  | Yes | Both | No |
| [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) | Yes | Yes | Yes |  | Global | Yes |
| [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) | Yes | Yes | Yes |  | Global | Yes |
| [**slow-start-timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_slow-start-timeout) | Yes | Yes |  |  |  |  |
| [**socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_socket) | Yes | Yes | Yes |  | Global | No |
| [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) | Yes | Yes | Yes |  | Both | Yes |
| [**Sort\_merge\_passes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_merge_passes) |  |  |  | Yes | Both | No |
| [**Sort\_range**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_range) |  |  |  | Yes | Both | No |
| [**Sort\_rows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_rows) |  |  |  | Yes | Both | No |
| [**Sort\_scan**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_scan) |  |  |  | Yes | Both | No |
| [**sporadic-binlog-dump-fail**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_sporadic-binlog-dump-fail) | Yes | Yes |  |  |  |  |
| [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null) |  |  | Yes |  | Both | Yes |
| [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) |  |  | Yes |  | Both | Yes |
| [**sql\_buffer\_result**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_buffer_result) |  |  | Yes |  | Both | Yes |
| [**sql\_log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_log_bin) |  |  | Yes |  | Session | Yes |
| [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) |  |  | Yes |  | Both | Yes |
| [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) | Yes | Yes | Yes |  | Both | Yes |
| [**sql\_notes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_notes) |  |  | Yes |  | Both | Yes |
| [**sql\_quote\_show\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_quote_show_create) |  |  | Yes |  | Both | Yes |
| [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) | Yes | Yes | Yes |  | Both | Yes |
| [**sql\_safe\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_safe_updates) |  |  | Yes |  | Both | Yes |
| [**sql\_select\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_select_limit) |  |  | Yes |  | Both | Yes |
| [**sql\_slave\_skip\_counter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_slave_skip_counter) |  |  | Yes |  | Global | Yes |
| [**sql\_warnings**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_warnings) |  |  | Yes |  | Both | Yes |
| [**ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) | Yes | Yes |  |  |  |  |
| [**Ssl\_accept\_renegotiates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_accept_renegotiates) |  |  |  | Yes | Global | No |
| [**Ssl\_accepts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_accepts) |  |  |  | Yes | Global | No |
| [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca) | Yes | Yes | Yes |  | Global | Varies |
| [**Ssl\_callback\_cache\_hits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_callback_cache_hits) |  |  |  | Yes | Global | No |
| [**ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_capath) | Yes | Yes | Yes |  | Global | Varies |
| [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) | Yes | Yes | Yes |  | Global | Varies |
| [**Ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_cipher) |  |  |  | Yes | Both | No |
| [**ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cipher) | Yes | Yes | Yes |  | Global | Varies |
| [**Ssl\_cipher\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_cipher_list) |  |  |  | Yes | Both | No |
| [**Ssl\_client\_connects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_client_connects) |  |  |  | Yes | Global | No |
| [**Ssl\_connect\_renegotiates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_connect_renegotiates) |  |  |  | Yes | Global | No |
| [**ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crl) | Yes | Yes | Yes |  | Global | Varies |
| [**ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crlpath) | Yes | Yes | Yes |  | Global | Varies |
| [**Ssl\_ctx\_verify\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_ctx_verify_depth) |  |  |  | Yes | Global | No |
| [**Ssl\_ctx\_verify\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_ctx_verify_mode) |  |  |  | Yes | Global | No |
| [**Ssl\_default\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_default_timeout) |  |  |  | Yes | Both | No |
| [**Ssl\_finished\_accepts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_finished_accepts) |  |  |  | Yes | Global | No |
| [**Ssl\_finished\_connects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_finished_connects) |  |  |  | Yes | Global | No |
| [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) | Yes | Yes | Yes |  | Global | Yes |
| [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key) | Yes | Yes | Yes |  | Global | Varies |
| [**Ssl\_server\_not\_after**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_server_not_after) |  |  |  | Yes | Both | No |
| [**Ssl\_server\_not\_before**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_server_not_before) |  |  |  | Yes | Both | No |
| [**Ssl\_session\_cache\_hits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_hits) |  |  |  | Yes | Global | No |
| [**Ssl\_session\_cache\_misses**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_misses) |  |  |  | Yes | Global | No |
| [**Ssl\_session\_cache\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_mode) |  |  |  | Yes | Global | No |
| [**Ssl\_session\_cache\_overflows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_overflows) |  |  |  | Yes | Global | No |
| [**Ssl\_session\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_size) |  |  |  | Yes | Global | No |
| [**Ssl\_session\_cache\_timeouts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_timeouts) |  |  |  | Yes | Global | No |
| [**Ssl\_sessions\_reused**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_sessions_reused) |  |  |  | Yes | Both | No |
| [**Ssl\_used\_session\_cache\_entries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_used_session_cache_entries) |  |  |  | Yes | Global | No |
| [**Ssl\_verify\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_verify_depth) |  |  |  | Yes | Both | No |
| [**Ssl\_verify\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_verify_mode) |  |  |  | Yes | Both | No |
| [**Ssl\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_version) |  |  |  | Yes | Both | No |
| [**standalone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_standalone) | Yes | Yes |  |  |  |  |
| [**stored\_program\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**stored\_program\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_definition_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**super-large-pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_super-large-pages) | Yes | Yes |  |  |  |  |
| [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) | Yes | Yes | Yes |  | Global | Yes |
| [**symbolic-links**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_symbolic-links) | Yes | Yes |  |  |  |  |
| [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) | Yes | Yes | Yes |  | Global | Yes |
| [**sync\_master\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_master_info) | Yes | Yes | Yes |  | Global | Yes |
| [**sync\_relay\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_relay_log) | Yes | Yes | Yes |  | Global | Yes |
| [**sync\_relay\_log\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_relay_log_info) | Yes | Yes | Yes |  | Global | Yes |
| [**sysdate-is-now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sysdate-is-now) | Yes | Yes |  |  |  |  |
| [**syseventlog.facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.facility) | Yes | Yes | Yes |  | Global | Yes |
| [**syseventlog.include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.include_pid) | Yes | Yes | Yes |  | Global | Yes |
| [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag) | Yes | Yes | Yes |  | Global | Yes |
| [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone) |  |  | Yes |  | Global | No |
| [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**table\_encryption\_privilege\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_encryption_privilege_check) | Yes | Yes | Yes |  | Global | Yes |
| [**Table\_locks\_immediate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_locks_immediate) |  |  |  | Yes | Global | No |
| [**Table\_locks\_waited**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_locks_waited) |  |  |  | Yes | Global | No |
| [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**Table\_open\_cache\_hits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_open_cache_hits) |  |  |  | Yes | Both | No |
| [**table\_open\_cache\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache_instances) | Yes | Yes | Yes |  | Global | No |
| [**Table\_open\_cache\_misses**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_open_cache_misses) |  |  |  | Yes | Both | No |
| [**Table\_open\_cache\_overflows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_open_cache_overflows) |  |  |  | Yes | Both | No |
| [**tablespace\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tablespace_definition_cache) | Yes | Yes | Yes |  | Global | Yes |
| [**tc-heuristic-recover**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_tc-heuristic-recover) | Yes | Yes |  |  |  |  |
| [**Tc\_log\_max\_pages\_used**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_max_pages_used) |  |  |  | Yes | Global | No |
| [**Tc\_log\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_page_size) |  |  |  | Yes | Global | No |
| [**Tc\_log\_page\_waits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_page_waits) |  |  |  | Yes | Global | No |
| [**temptable\_max\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_mmap) | Yes | Yes | Yes |  | Global | Yes |
| [**temptable\_max\_ram**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_ram) | Yes | Yes | Yes |  | Global | Yes |
| [**temptable\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_use_mmap) | Yes | Yes | Yes |  | Global | Yes |
| [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) | Yes | Yes | Yes |  | Global | Yes |
| [**thread\_handling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_handling) | Yes | Yes | Yes |  | Global | No |
| [**thread\_pool\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_algorithm) | Yes | Yes | Yes |  | Global | No |
| [**thread\_pool\_high\_priority\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_high_priority_connection) | Yes | Yes | Yes |  | Both | Yes |
| [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads) | Yes | Yes | Yes |  | Global | Yes |
| [**thread\_pool\_max\_unused\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_unused_threads) | Yes | Yes | Yes |  | Global | Yes |
| [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer) | Yes | Yes | Yes |  | Global | Yes |
| [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) | Yes | Yes | Yes |  | Global | No |
| [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) | Yes | Yes | Yes |  | Global | Yes |
| [**thread\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_stack) | Yes | Yes | Yes |  | Global | No |
| [**Threads\_cached**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_cached) |  |  |  | Yes | Global | No |
| [**Threads\_connected**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_connected) |  |  |  | Yes | Global | No |
| [**Threads\_created**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_created) |  |  |  | Yes | Global | No |
| [**Threads\_running**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_running) |  |  |  | Yes | Global | No |
| [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) |  |  | Yes |  | Both | Yes |
| [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) |  |  | Yes |  | Session | Yes |
| [**tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_ciphersuites) | Yes | Yes | Yes |  | Global | Yes |
| [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version) | Yes | Yes | Yes |  | Global | Varies |
| [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) | Yes | Yes | Yes |  | Both | Yes |
| [**tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_tmpdir) | Yes | Yes | Yes |  | Global | No |
| [**transaction\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_alloc_block_size) | Yes | Yes | Yes |  | Both | Yes |
| [**transaction\_allow\_batching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_transaction_allow_batching) |  |  | Yes |  | Session | Yes |
| [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_transaction-isolation) | Yes | Yes | Yes |  | Both | Yes |
| [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size) | Yes | Yes | Yes |  | Both | Yes |
| [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_transaction-read-only) | Yes | Yes | Yes |  | Both | Yes |
| [**transaction\_write\_set\_extraction**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_transaction_write_set_extraction) | Yes | Yes | Yes |  | Both | Yes |
| [**unique\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_unique_checks) |  |  | Yes |  | Both | Yes |
| [**updatable\_views\_with\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_updatable_views_with_limit) | Yes | Yes | Yes |  | Both | Yes |
| [**upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_upgrade) | Yes | Yes |  |  |  |  |
| [**Uptime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Uptime) |  |  |  | Yes | Global | No |
| [**Uptime\_since\_flush\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Uptime_since_flush_status) |  |  |  | Yes | Global | No |
| [**use\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_use_secondary_engine) |  |  | Yes |  | Session | Yes |
| [**user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) | Yes | Yes |  |  |  |  |
| [**validate-config**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-config) | Yes | Yes |  |  |  |  |
| [**validate-password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#option_mysqld_validate-password) | Yes | Yes |  |  |  |  |
| [**validate\_password\_check\_user\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_check_user_name) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password\_dictionary\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_dictionary_file) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password\_dictionary\_file\_last\_parsed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password_dictionary_file_last_parsed) |  |  |  | Yes | Global | No |
| [**validate\_password\_dictionary\_file\_words\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password_dictionary_file_words_count) |  |  |  | Yes | Global | No |
| [**validate\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_length) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password\_mixed\_case\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_mixed_case_count) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password\_number\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_number_count) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_policy) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password\_special\_char\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_special_char_count) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.check\_user\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.check_user_name) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.dictionary\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.dictionary_file) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.dictionary\_file\_last\_parsed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password.dictionary_file_last_parsed) |  |  |  | Yes | Global | No |
| [**validate\_password.dictionary\_file\_words\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password.dictionary_file_words_count) |  |  |  | Yes | Global | No |
| [**validate\_password.length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.length) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.mixed\_case\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.mixed_case_count) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.number\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.number_count) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.policy) | Yes | Yes | Yes |  | Global | Yes |
| [**validate\_password.special\_char\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.special_char_count) | Yes | Yes | Yes |  | Global | Yes |
| [**validate-user-plugins**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-user-plugins) | Yes | Yes |  |  |  |  |
| [**verbose**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_verbose) | Yes | Yes |  |  |  |  |
| [**version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version) |  |  | Yes |  | Global | No |
| [**version\_comment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_comment) |  |  | Yes |  | Global | No |
| [**version\_compile\_machine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_machine) |  |  | Yes |  | Global | No |
| [**version\_compile\_os**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_os) |  |  | Yes |  | Global | No |
| [**version\_compile\_zlib**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_zlib) |  |  | Yes |  | Global | No |
| [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) | Yes | Yes | Yes |  | Both | Yes |
| [**version\_tokens\_session\_number**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session_number) | Yes | Yes | Yes |  | Both | No |
| [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) | Yes | Yes | Yes |  | Both | Yes |
| [**warning\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_warning_count) |  |  | Yes |  | Session | No |
| [**windowing\_use\_high\_precision**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_windowing_use_high_precision) | Yes | Yes | Yes |  | Both | Yes |

***Notes:***

1. This option is dynamic, but should be set only by server. You should not set this variable manually.

### 5.1.5 服务端系统变量参考

The following table lists all system variables applicable within **mysqld**.

The table lists command-line options (Cmd-line), options valid in configuration files (Option file), server system variables (System Var), and status variables (Status var) in one unified list, with an indication of where each option or variable is valid. If a server option set on the command line or in an option file differs from the name of the corresponding system variable, the variable name is noted immediately below the corresponding option. The scope of the variable (Var Scope) is Global, Session, or both. Please see the corresponding item descriptions for details on setting and using the variables. Where appropriate, direct links to further information about the items are provided.

**Table 5.2 System Variable Summary**

| **Name** | **Cmd-Line** | **Option File** | **System Var** | **Var Scope** | **Dynamic** |
| --- | --- | --- | --- | --- | --- |
| [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) | Yes | Yes | Yes | Global | Yes |
| [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) | Yes | Yes | Yes | Global | No |
| [**admin\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_port) | Yes | Yes | Yes | Global | No |
| [**admin\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_ca) | Yes | Yes | Yes | Global | Yes |
| [**admin\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_capath) | Yes | Yes | Yes | Global | Yes |
| [**admin\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cert) | Yes | Yes | Yes | Global | Yes |
| [**admin\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cipher) | Yes | Yes | Yes | Global | Yes |
| [**admin\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crl) | Yes | Yes | Yes | Global | Yes |
| [**admin\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crlpath) | Yes | Yes | Yes | Global | Yes |
| [**admin\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_key) | Yes | Yes | Yes | Global | Yes |
| [**admin\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_ciphersuites) | Yes | Yes | Yes | Global | Yes |
| [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_buffer_size) | Yes | Yes | Yes | Global | No |
| [**audit\_log\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_compression) | Yes | Yes | Yes | Global | No |
| [**audit\_log\_connection\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_connection_policy) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_current\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_current_session) |  |  | Yes | Both | No |
| [**audit\_log\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_encryption) | Yes | Yes | Yes | Global | No |
| [**audit\_log\_exclude\_accounts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_exclude_accounts) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_file) | Yes | Yes | Yes | Global | No |
| [**audit\_log\_filter\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_filter_id) |  |  | Yes | Both | No |
| [**audit\_log\_flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_flush) |  |  | Yes | Global | Yes |
| [**audit\_log\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_format) | Yes | Yes | Yes | Global | No |
| [**audit\_log\_include\_accounts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_include_accounts) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_max_size) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_password\_history\_keep\_days**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_password_history_keep_days) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_policy) | Yes | Yes | Yes | Global | No |
| [**audit\_log\_prune\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_prune_seconds) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_read_buffer_size) | Yes | Yes | Yes | Varies | Varies |
| [**audit\_log\_rotate\_on\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_rotate_on_size) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_statement\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_statement_policy) | Yes | Yes | Yes | Global | Yes |
| [**audit\_log\_strategy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_strategy) | Yes | Yes | Yes | Global | No |
| [**authentication\_ldap\_sasl\_auth\_method\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_auth_method_name) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_bind\_base\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_base_dn) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_bind\_root\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_root_dn) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_bind\_root\_pwd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_root_pwd) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_ca_path) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_group\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_group_search_attr) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_group\_search\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_group_search_filter) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_init\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_init_pool_size) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_log\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_log_status) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_max\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_max_pool_size) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_referral**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_referral) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_server\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_server_host) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_server\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_server_port) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_tls**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_tls) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_sasl\_user\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_user_search_attr) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_auth\_method\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_auth_method_name) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_bind\_base\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_base_dn) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_bind\_root\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_root_dn) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_bind\_root\_pwd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_root_pwd) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_ca_path) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_group\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_group_search_attr) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_group\_search\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_group_search_filter) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_init\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_init_pool_size) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_log\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_log_status) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_max\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_max_pool_size) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_referral**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_referral) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_server\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_server_host) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_server\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_server_port) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_tls**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_tls) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_ldap\_simple\_user\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_user_search_attr) | Yes | Yes | Yes | Global | Yes |
| [**authentication\_windows\_log\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_authentication_windows_log_level) | Yes | Yes | Yes | Global | No |
| [**authentication\_windows\_use\_principal\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_authentication_windows_use_principal_name) | Yes | Yes | Yes | Global | No |
| [**auto\_generate\_certs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_auto_generate_certs) | Yes | Yes | Yes | Global | No |
| [**auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_increment) | Yes | Yes | Yes | Both | Yes |
| [**auto\_increment\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_offset) | Yes | Yes | Yes | Both | Yes |
| [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) | Yes | Yes | Yes | Both | Yes |
| [**automatic\_sp\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges) | Yes | Yes | Yes | Global | Yes |
| [**avoid\_temporal\_upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_avoid_temporal_upgrade) | Yes | Yes | Yes | Global | Yes |
| [**back\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_back_log) | Yes | Yes | Yes | Global | No |
| [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) | Yes | Yes | Yes | Global | No |
| [**big\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_big_tables) | Yes | Yes | Yes | Both | Yes |
| [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) | Yes | Yes | Yes | Global | No |
| [**binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_checksum) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_direct\_non\_transactional\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_direct_non_transactional_updates) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_encryption) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_error\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_error_action) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_expire\_logs\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_expire_logs_seconds) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_group\_commit\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_group_commit_sync_delay) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_group\_commit\_sync\_no\_delay\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_group_commit_sync_no_delay_count) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_gtid\_simple\_recovery**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_gtid_simple_recovery) | Yes | Yes | Yes | Global | No |
| [**binlog\_max\_flush\_queue\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_max_flush_queue_time) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_order\_commits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_order_commits) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_rotate\_encryption\_master\_key\_at\_startup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_rotate_encryption_master_key_at_startup) | Yes | Yes | Yes | Global | No |
| [**binlog\_row\_event\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-row-event-max-size) | Yes | Yes | Yes | Global | No |
| [**binlog\_row\_image**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_image) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_row\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_metadata) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_row\_value\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_value_options) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_rows\_query\_log\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_rows_query_log_events) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_stmt_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_transaction\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_transaction\_compression\_level\_zstd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression_level_zstd) | Yes | Yes | Yes | Both | Yes |
| [**binlog\_transaction\_dependency\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_dependency_history_size) | Yes | Yes | Yes | Global | Yes |
| [**binlog\_transaction\_dependency\_tracking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_dependency_tracking) | Yes | Yes | Yes | Global | Yes |
| [**block\_encryption\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_block_encryption_mode) | Yes | Yes | Yes | Both | Yes |
| [**bulk\_insert\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bulk_insert_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**caching\_sha2\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_auto_generate_rsa_keys) | Yes | Yes | Yes | Global | No |
| [**caching\_sha2\_password\_digest\_rounds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_digest_rounds) | Yes | Yes | Yes | Global | No |
| [**caching\_sha2\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_private_key_path) | Yes | Yes | Yes | Global | No |
| [**caching\_sha2\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_public_key_path) | Yes | Yes | Yes | Global | No |
| [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) |  |  | Yes | Both | Yes |
| [**character\_set\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_connection) |  |  | Yes | Both | Yes |
| [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database)**(note 1)** |  |  | Yes | Both | Yes |
| [**character\_set\_filesystem**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_filesystem) | Yes | Yes | Yes | Both | Yes |
| [**character\_set\_results**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_results) |  |  | Yes | Both | Yes |
| [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server) | Yes | Yes | Yes | Both | Yes |
| [**character\_set\_system**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_system) |  |  | Yes | Global | No |
| [**character\_sets\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_sets_dir) | Yes | Yes | Yes | Global | No |
| [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) | Yes | Yes | Yes | Global | Yes |
| [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) | Yes | Yes | Yes | Global | Yes |
| [**clone\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_buffer_size) | Yes | Yes | Yes | Global | Yes |
| [**clone\_ddl\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ddl_timeout) | Yes | Yes | Yes | Global | Yes |
| [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) | Yes | Yes | Yes | Global | Yes |
| [**clone\_enable\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_enable_compression) | Yes | Yes | Yes | Global | Yes |
| [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) | Yes | Yes | Yes | Global | Yes |
| [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) | Yes | Yes | Yes | Global | Yes |
| [**clone\_max\_network\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_network_bandwidth) | Yes | Yes | Yes | Global | Yes |
| [**clone\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_ca) | Yes | Yes | Yes | Global | Yes |
| [**clone\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_cert) | Yes | Yes | Yes | Global | Yes |
| [**clone\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_key) | Yes | Yes | Yes | Global | Yes |
| [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) | Yes | Yes | Yes | Global | Yes |
| [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection) |  |  | Yes | Both | Yes |
| [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database)**(note 1)** |  |  | Yes | Both | Yes |
| [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server) | Yes | Yes | Yes | Both | Yes |
| [**completion\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_completion_type) | Yes | Yes | Yes | Both | Yes |
| [**concurrent\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_concurrent_insert) | Yes | Yes | Yes | Global | Yes |
| [**connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_connect_timeout) | Yes | Yes | Yes | Global | Yes |
| [**connection\_control\_failed\_connections\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_failed_connections_threshold) | Yes | Yes | Yes | Global | Yes |
| [**connection\_control\_max\_connection\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_max_connection_delay) | Yes | Yes | Yes | Global | Yes |
| [**connection\_control\_min\_connection\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_min_connection_delay) | Yes | Yes | Yes | Global | Yes |
| [**core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_core_file) |  |  | Yes | Global | No |
| [**create\_admin\_listener\_thread**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_create_admin_listener_thread) | Yes | Yes | Yes | Global | No |
| [**cte\_max\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_cte_max_recursion_depth) | Yes | Yes | Yes | Both | Yes |
| [**daemon\_memcached\_enable\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_enable_binlog) | Yes | Yes | Yes | Global | No |
| [**daemon\_memcached\_engine\_lib\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_engine_lib_name) | Yes | Yes | Yes | Global | No |
| [**daemon\_memcached\_engine\_lib\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_engine_lib_path) | Yes | Yes | Yes | Global | No |
| [**daemon\_memcached\_option**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_option) | Yes | Yes | Yes | Global | No |
| [**daemon\_memcached\_r\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_r_batch_size) | Yes | Yes | Yes | Global | No |
| [**daemon\_memcached\_w\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_daemon_memcached_w_batch_size) | Yes | Yes | Yes | Global | No |
| [**datadir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) | Yes | Yes | Yes | Global | No |
| [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) | Yes | Yes | Yes | Both | Yes |
| [**debug\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug_sync) |  |  | Yes | Session | Yes |
| [**default\_authentication\_plugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_authentication_plugin) | Yes | Yes | Yes | Global | No |
| [**default\_collation\_for\_utf8mb4**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_collation_for_utf8mb4) |  |  | Yes | Both | Yes |
| [**default\_password\_lifetime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_password_lifetime) | Yes | Yes | Yes | Global | Yes |
| [**default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) | Yes | Yes | Yes | Both | Yes |
| [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) | Yes | Yes | Yes | Both | Yes |
| [**default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) | Yes | Yes | Yes | Both | Yes |
| [**default\_week\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_week_format) | Yes | Yes | Yes | Both | Yes |
| [**delay\_key\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delay_key_write) | Yes | Yes | Yes | Global | Yes |
| [**delayed\_insert\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_limit) | Yes | Yes | Yes | Global | Yes |
| [**delayed\_insert\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_timeout) | Yes | Yes | Yes | Global | Yes |
| [**delayed\_queue\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_queue_size) | Yes | Yes | Yes | Global | Yes |
| [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) | Yes | Yes | Yes | Global | No |
| [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password) | Yes | Yes | Yes | Global | No |
| [**div\_precision\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_div_precision_increment) | Yes | Yes | Yes | Both | Yes |
| [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) | Yes | Yes | Yes | Global | Yes |
| [**end\_markers\_in\_json**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_end_markers_in_json) | Yes | Yes | Yes | Both | Yes |
| [**enforce\_gtid\_consistency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_enforce_gtid_consistency) | Yes | Yes | Yes | Global | Yes |
| [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) | Yes | Yes | Yes | Both | Yes |
| [**error\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_error_count) |  |  | Yes | Session | No |
| [**event\_scheduler**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_event_scheduler) | Yes | Yes | Yes | Global | Yes |
| [**expire\_logs\_days**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_expire_logs_days) | Yes | Yes | Yes | Global | Yes |
| [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) | Yes | Yes | Yes | Both | Yes |
| [**external\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_external_user) |  |  | Yes | Session | No |
| [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) | Yes | Yes | Yes | Global | Yes |
| [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) | Yes | Yes | Yes | Global | Yes |
| [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks) |  |  | Yes | Both | Yes |
| [**ft\_boolean\_syntax**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_boolean_syntax) | Yes | Yes | Yes | Global | Yes |
| [**ft\_max\_word\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_max_word_len) | Yes | Yes | Yes | Global | No |
| [**ft\_min\_word\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_min_word_len) | Yes | Yes | Yes | Global | No |
| [**ft\_query\_expansion\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_query_expansion_limit) | Yes | Yes | Yes | Global | No |
| [**ft\_stopword\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_stopword_file) | Yes | Yes | Yes | Global | No |
| [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) | Yes | Yes | Yes | Global | Yes |
| [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) | Yes | Yes | Yes | Global | Yes |
| [**generated\_random\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_generated_random_password_length) | Yes | Yes | Yes | Both | Yes |
| [**group\_concat\_max\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_group_concat_max_len) | Yes | Yes | Yes | Both | Yes |
| [**group\_replication\_advertise\_recovery\_endpoints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_advertise_recovery_endpoints) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_allow\_local\_lower\_version\_join**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_allow_local_lower_version_join) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_auto_increment_increment) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_autorejoin\_tries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_autorejoin_tries) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_bootstrap\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_bootstrap_group) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_clone\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_clone_threshold) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_communication\_debug\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_communication_debug_options) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_communication\_max\_message\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_communication_max_message_size) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_components\_stop\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_components_stop_timeout) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_compression\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_compression_threshold) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_consistency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_consistency) | Yes | Yes | Yes | Both | Yes |
| [**group\_replication\_enforce\_update\_everywhere\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_enforce_update_everywhere_checks) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_exit\_state\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_exit_state_action) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_applier\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_applier_threshold) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_certifier\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_certifier_threshold) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_hold\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_hold_percent) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_max\_commit\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_max_commit_quota) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_member\_quota\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_member_quota_percent) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_min\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_min_quota) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_min\_recovery\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_min_recovery_quota) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_mode) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_period) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_flow\_control\_release\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_release_percent) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_force\_members**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_force_members) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_group\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_group_name) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_group\_seeds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_group_seeds) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_gtid\_assignment\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_gtid_assignment_block_size) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_ip\_allowlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ip_allowlist) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_ip\_whitelist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ip_whitelist) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_local\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_local_address) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_member\_expel\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_member_expel_timeout) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_member\_weight**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_member_weight) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_message\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_message_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_poll\_spin\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_poll_spin_loops) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_complete\_at**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_complete_at) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_compression_algorithms) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_get\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_get_public_key) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_public_key_path) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_reconnect\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_reconnect_interval) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_retry_count) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_ca) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_capath) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_cert) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_cipher) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_crl) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_crlpath) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_key) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_ssl\_verify\_server\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_verify_server_cert) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_tls_ciphersuites) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_tls_version) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_use\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_use_ssl) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_recovery\_zstd\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_zstd_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_single\_primary\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_single_primary_mode) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_ssl\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ssl_mode) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_start\_on\_boot**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_start_on_boot) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_tls\_source**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_tls_source) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_transaction\_size\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_transaction_size_limit) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_unreachable\_majority\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_unreachable_majority_timeout) | Yes | Yes | Yes | Global | Yes |
| [**group\_replication\_view\_change\_uuid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_view_change_uuid) | Yes | Yes | Yes | Global | Yes |
| [**gtid\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed) |  |  | Yes | Global | No |
| [**gtid\_executed\_compression\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed_compression_period) | Yes | Yes | Yes | Global | Yes |
| [**gtid\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_mode) | Yes | Yes | Yes | Global | Yes |
| [**gtid\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_next) |  |  | Yes | Session | Yes |
| [**gtid\_owned**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_owned) |  |  | Yes | Both | No |
| [**gtid\_purged**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_purged) |  |  | Yes | Global | Yes |
| [**have\_compress**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_compress) |  |  | Yes | Global | No |
| [**have\_dynamic\_loading**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_dynamic_loading) |  |  | Yes | Global | No |
| [**have\_geometry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_geometry) |  |  | Yes | Global | No |
| [**have\_openssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_openssl) |  |  | Yes | Global | No |
| [**have\_profiling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_profiling) |  |  | Yes | Global | No |
| [**have\_query\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_query_cache) |  |  | Yes | Global | No |
| [**have\_rtree\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_rtree_keys) |  |  | Yes | Global | No |
| [**have\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_ssl) |  |  | Yes | Global | No |
| [**have\_statement\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_statement_timeout) |  |  | Yes | Global | No |
| [**have\_symlink**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_symlink) |  |  | Yes | Global | No |
| [**histogram\_generation\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_histogram_generation_max_mem_size) | Yes | Yes | Yes | Both | Yes |
| [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**hostname**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_hostname) |  |  | Yes | Global | No |
| [**identity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_identity) |  |  | Yes | Session | Yes |
| [**immediate\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_immediate_server_version) |  |  | Yes | Session | Yes |
| [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) | Yes | Yes | Yes | Both | Yes |
| [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) | Yes | Yes | Yes | Global | Yes |
| [**init\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_file) | Yes | Yes | Yes | Global | No |
| [**init\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_init_slave) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_adaptive\_flushing**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_flushing) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_adaptive\_flushing\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_flushing_lwm) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_adaptive\_hash\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_hash_index) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_adaptive\_hash\_index\_parts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_hash_index_parts) | Yes | Yes | Yes | Global | No |
| [**innodb\_adaptive\_max\_sleep\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_max_sleep_delay) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_api\_bk\_commit\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_bk_commit_interval) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_api\_disable\_rowlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_disable_rowlock) | Yes | Yes | Yes | Global | No |
| [**innodb\_api\_enable\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_enable_binlog) | Yes | Yes | Yes | Global | No |
| [**innodb\_api\_enable\_mdl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_enable_mdl) | Yes | Yes | Yes | Global | No |
| [**innodb\_api\_trx\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_trx_level) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_autoextend\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_autoextend_increment) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_autoinc\_lock\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_autoinc_lock_mode) | Yes | Yes | Yes | Global | No |
| [**innodb\_background\_drop\_list\_empty**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_background_drop_list_empty) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_chunk\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_chunk_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_buffer\_pool\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_debug) | Yes | Yes | Yes | Global | No |
| [**innodb\_buffer\_pool\_dump\_at\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_at_shutdown) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_dump\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_now) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_dump\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_pct) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_filename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_filename) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_in\_core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_in_core_file) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_instances) | Yes | Yes | Yes | Global | No |
| [**innodb\_buffer\_pool\_load\_abort**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_abort) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_load\_at\_startup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_at_startup) | Yes | Yes | Yes | Global | No |
| [**innodb\_buffer\_pool\_load\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_now) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_buffer\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_size) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_change\_buffer\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffer_max_size) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_change\_buffering**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffering) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_change\_buffering\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffering_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_checkpoint\_disabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_checkpoint_disabled) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_checksum\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_checksum_algorithm) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_cmp\_per\_index\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_cmp_per_index_enabled) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_commit\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_commit_concurrency) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_compress\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compress_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_compression\_failure\_threshold\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_failure_threshold_pct) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_compression\_pad\_pct\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_pad_pct_max) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_concurrency\_tickets**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_concurrency_tickets) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_file_path) | Yes | Yes | Yes | Global | No |
| [**innodb\_data\_home\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_home_dir) | Yes | Yes | Yes | Global | No |
| [**innodb\_ddl\_log\_crash\_reset\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ddl_log_crash_reset_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_deadlock\_detect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_deadlock_detect) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_dedicated\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_dedicated_server) | Yes | Yes | Yes | Global | No |
| [**innodb\_default\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_default_row_format) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_directories**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_directories) | Yes | Yes | Yes | Global | No |
| [**innodb\_disable\_sort\_file\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_disable_sort_file_cache) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_doublewrite**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite) | Yes | Yes | Yes | Global | No |
| [**innodb\_doublewrite\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_batch_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_doublewrite\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_dir) | Yes | Yes | Yes | Global | No |
| [**innodb\_doublewrite\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_files) | Yes | Yes | Yes | Global | No |
| [**innodb\_doublewrite\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_doublewrite_pages) | Yes | Yes | Yes | Global | No |
| [**innodb\_extend\_and\_initialize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_extend_and_initialize) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_fast\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fast_shutdown) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_fil\_make\_page\_dirty\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fil_make_page_dirty_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_file\_per\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_fill\_factor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fill_factor) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_flush\_log\_at\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_log_at_timeout) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_flush\_log\_at\_trx\_commit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_log_at_trx_commit) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_flush\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_method) | Yes | Yes | Yes | Global | No |
| [**innodb\_flush\_neighbors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_neighbors) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_flush\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_sync) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_flushing\_avg\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flushing_avg_loops) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_force\_load\_corrupted**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_force_load_corrupted) | Yes | Yes | Yes | Global | No |
| [**innodb\_force\_recovery**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_force_recovery) | Yes | Yes | Yes | Global | No |
| [**innodb\_fsync\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fsync_threshold) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_ft\_aux\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_aux_table) |  |  | Yes | Global | Yes |
| [**innodb\_ft\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_cache_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_ft\_enable\_diag\_print**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_enable_diag_print) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_ft\_enable\_stopword**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_enable_stopword) | Yes | Yes | Yes | Both | Yes |
| [**innodb\_ft\_max\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_max_token_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_ft\_min\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_min_token_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_ft\_num\_word\_optimize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_num_word_optimize) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_ft\_result\_cache\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_result_cache_limit) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_ft\_server\_stopword\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_server_stopword_table) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_ft\_sort\_pll\_degree**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_sort_pll_degree) | Yes | Yes | Yes | Global | No |
| [**innodb\_ft\_total\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_total_cache_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_ft\_user\_stopword\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_user_stopword_table) | Yes | Yes | Yes | Both | Yes |
| [**innodb\_idle\_flush\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_idle_flush_pct) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_io\_capacity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_io_capacity) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_io\_capacity\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_io_capacity_max) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_limit\_optimistic\_insert\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_limit_optimistic_insert_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_lock_wait_timeout) | Yes | Yes | Yes | Both | Yes |
| [**innodb\_log\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_buffer_size) | Yes | Yes | Yes | Global | Varies |
| [**innodb\_log\_checkpoint\_fuzzy\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checkpoint_fuzzy_now) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_checkpoint\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checkpoint_now) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_checksums**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checksums) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_compressed\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_compressed_pages) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_file_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_log\_files\_in\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_files_in_group) | Yes | Yes | Yes | Global | No |
| [**innodb\_log\_group\_home\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_group_home_dir) | Yes | Yes | Yes | Global | No |
| [**innodb\_log\_spin\_cpu\_abs\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_spin_cpu_abs_lwm) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_spin\_cpu\_pct\_hwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_spin_cpu_pct_hwm) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_wait\_for\_flush\_spin\_hwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_wait_for_flush_spin_hwm) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_write\_ahead\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_write_ahead_size) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_log\_writer\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_writer_threads) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_lru\_scan\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_lru_scan_depth) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_max\_dirty\_pages\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_dirty_pages_pct) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_max\_dirty\_pages\_pct\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_dirty_pages_pct_lwm) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_max\_purge\_lag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_purge_lag) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_max\_purge\_lag\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_purge_lag_delay) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_max\_undo\_log\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_undo_log_size) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_merge\_threshold\_set\_all\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_merge_threshold_set_all_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_monitor\_disable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_disable) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_monitor\_enable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_enable) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_monitor\_reset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_reset) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_monitor\_reset\_all**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_reset_all) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_numa\_interleave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_numa_interleave) | Yes | Yes | Yes | Global | No |
| [**innodb\_old\_blocks\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_old_blocks_pct) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_old\_blocks\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_old_blocks_time) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_online\_alter\_log\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_online_alter_log_max_size) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_open_files) | Yes | Yes | Yes | Global | No |
| [**innodb\_optimize\_fulltext\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_optimize_fulltext_only) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_page\_cleaners**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_page_cleaners) | Yes | Yes | Yes | Global | No |
| [**innodb\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_page_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_parallel\_read\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_parallel_read_threads) | Yes | Yes | Yes | Session | Yes |
| [**innodb\_print\_all\_deadlocks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_print_all_deadlocks) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_print\_ddl\_logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_print_ddl_logs) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_purge\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_batch_size) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_purge\_rseg\_truncate\_frequency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_rseg_truncate_frequency) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_purge\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_threads) | Yes | Yes | Yes | Global | No |
| [**innodb\_random\_read\_ahead**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_random_read_ahead) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_read\_ahead\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_ahead_threshold) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_read\_io\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_io_threads) | Yes | Yes | Yes | Global | No |
| [**innodb\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_only) | Yes | Yes | Yes | Global | No |
| [**innodb\_redo\_log\_archive\_dirs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_archive_dirs) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_redo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_encrypt) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_replication\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_replication_delay) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_rollback\_on\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_rollback_on_timeout) | Yes | Yes | Yes | Global | No |
| [**innodb\_rollback\_segments**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_rollback_segments) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_saved\_page\_number\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_saved_page_number_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_segment\_reserve\_factor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_segment_reserve_factor) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sort_buffer_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_spin\_wait\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_spin_wait_delay) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_spin\_wait\_pause\_multiplier**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_spin_wait_pause_multiplier) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_auto\_recalc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_auto_recalc) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_include\_delete\_marked**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_include_delete_marked) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_method) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_on\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_on_metadata) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_persistent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_persistent) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_persistent\_sample\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_persistent_sample_pages) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_stats\_transient\_sample\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_transient_sample_pages) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_status\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_status_output) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_status\_output\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_status_output_locks) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_strict\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_strict_mode) | Yes | Yes | Yes | Both | Yes |
| [**innodb\_sync\_array\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_array_size) | Yes | Yes | Yes | Global | No |
| [**innodb\_sync\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_debug) | Yes | Yes | Yes | Global | No |
| [**innodb\_sync\_spin\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_spin_loops) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_table\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_table_locks) | Yes | Yes | Yes | Both | Yes |
| [**innodb\_temp\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_temp_data_file_path) | Yes | Yes | Yes | Global | No |
| [**innodb\_temp\_tablespaces\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_temp_tablespaces_dir) | Yes | Yes | Yes | Global | No |
| [**innodb\_thread\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_thread_concurrency) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_thread\_sleep\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_thread_sleep_delay) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_tmpdir) | Yes | Yes | Yes | Both | Yes |
| [**innodb\_trx\_purge\_view\_update\_only\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_trx_purge_view_update_only_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_trx\_rseg\_n\_slots\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_trx_rseg_n_slots_debug) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_undo\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_directory) | Yes | Yes | Yes | Global | No |
| [**innodb\_undo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_encrypt) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_undo\_log\_truncate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_truncate) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_undo\_tablespaces**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_tablespaces) | Yes | Yes | Yes | Global | Varies |
| [**innodb\_use\_fdatasync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_use_fdatasync) | Yes | Yes | Yes | Global | Yes |
| [**innodb\_use\_native\_aio**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_use_native_aio) | Yes | Yes | Yes | Global | No |
| [**innodb\_validate\_tablespace\_paths**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_validate_tablespace_paths) | Yes | Yes | Yes | Global | No |
| [**innodb\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_version) |  |  | Yes | Global | No |
| [**innodb\_write\_io\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_write_io_threads) | Yes | Yes | Yes | Global | No |
| [**insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_insert_id) |  |  | Yes | Session | Yes |
| [**interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_interactive_timeout) | Yes | Yes | Yes | Both | Yes |
| [**internal\_tmp\_disk\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_disk_storage_engine) | Yes | Yes | Yes | Global | Yes |
| [**internal\_tmp\_mem\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_mem_storage_engine) | Yes | Yes | Yes | Both | Yes |
| [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**keep\_files\_on\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_keep_files_on_create) | Yes | Yes | Yes | Both | Yes |
| [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) | Yes | Yes | Yes | Global | Yes |
| [**key\_cache\_age\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_age_threshold) | Yes | Yes | Yes | Global | Yes |
| [**key\_cache\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_block_size) | Yes | Yes | Yes | Global | Yes |
| [**key\_cache\_division\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_division_limit) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_aws\_cmk\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_cmk_id) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_aws\_conf\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_conf_file) | Yes | Yes | Yes | Global | No |
| [**keyring\_aws\_data\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_data_file) | Yes | Yes | Yes | Global | No |
| [**keyring\_aws\_region**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_region) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_encrypted\_file\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_encrypted_file_data) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_encrypted\_file\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_encrypted_file_password) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_file\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_file_data) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_auth\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_auth_path) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_ca_path) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_caching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_caching) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_commit\_auth\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_auth_path) |  |  | Yes | Global | No |
| [**keyring\_hashicorp\_commit\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_ca_path) |  |  | Yes | Global | No |
| [**keyring\_hashicorp\_commit\_caching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_caching) |  |  | Yes | Global | No |
| [**keyring\_hashicorp\_commit\_role\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_role_id) |  |  | Yes | Global | No |
| [**keyring\_hashicorp\_commit\_server\_url**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_server_url) |  |  | Yes | Global | No |
| [**keyring\_hashicorp\_commit\_store\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_commit_store_path) |  |  | Yes | Global | No |
| [**keyring\_hashicorp\_role\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_role_id) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_secret\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_secret_id) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_server\_url**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_server_url) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_hashicorp\_store\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_store_path) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_oci\_ca\_certificate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_ca_certificate) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_compartment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_compartment) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_encryption\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_encryption_endpoint) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_key\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_key_file) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_key\_fingerprint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_key_fingerprint) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_management\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_management_endpoint) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_master\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_master_key) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_secrets\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_secrets_endpoint) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_tenancy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_tenancy) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_user) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_vaults\_endpoint**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_vaults_endpoint) | Yes | Yes | Yes | Global | No |
| [**keyring\_oci\_virtual\_vault**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_oci_virtual_vault) | Yes | Yes | Yes | Global | No |
| [**keyring\_okv\_conf\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_okv_conf_dir) | Yes | Yes | Yes | Global | Yes |
| [**keyring\_operations**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_operations) |  |  | Yes | Global | Yes |
| [**language**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_language) | Yes | Yes | Yes | Global | No |
| [**large\_files\_support**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_files_support) |  |  | Yes | Global | No |
| [**large\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_page_size) |  |  | Yes | Global | No |
| [**large\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_large-pages) | Yes | Yes | Yes | Global | No |
| [**last\_insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_last_insert_id) |  |  | Yes | Session | Yes |
| [**lc\_messages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages) | Yes | Yes | Yes | Both | Yes |
| [**lc\_messages\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages-dir) | Yes | Yes | Yes | Global | No |
| [**lc\_time\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_time_names) | Yes | Yes | Yes | Both | Yes |
| [**license**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_license) |  |  | Yes | Global | No |
| [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) | Yes | Yes | Yes | Global | Yes |
| [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_debug\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_loop) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_debug\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_arc) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_debug\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_key) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_debug\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_unlock) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_dependencies) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_extra\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_extra_dependencies) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_output\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_output_directory) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_print\_txt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_print_txt) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_trace\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_loop) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_trace\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_arc) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_trace\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_key) | Yes | Yes | Yes | Global | No |
| [**lock\_order\_trace\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_unlock) | Yes | Yes | Yes | Global | No |
| [**lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_wait_timeout) | Yes | Yes | Yes | Both | Yes |
| [**locked\_in\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_locked_in_memory) |  |  | Yes | Global | No |
| [**log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin) |  |  | Yes | Global | No |
| [**log\_bin\_basename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_basename) |  |  | Yes | Global | No |
| [**log\_bin\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin-index) | Yes | Yes | Yes | Global | No |
| [**log\_bin\_trust\_function\_creators**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_trust_function_creators) | Yes | Yes | Yes | Global | Yes |
| [**log\_bin\_use\_v1\_row\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_use_v1_row_events) | Yes | Yes | Yes | Global | Yes |
| [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) | Yes | Yes | Yes | Global | No |
| [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) | Yes | Yes | Yes | Global | Yes |
| [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) | Yes | Yes | Yes | Global | Yes |
| [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) | Yes | Yes | Yes | Global | Yes |
| [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) | Yes | Yes | Yes | Global | Yes |
| [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) | Yes | Yes | Yes | Global | Yes |
| [**log\_raw**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) | Yes | Yes | Yes | Global | Yes |
| [**log\_slave\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slave_updates) | Yes | Yes | Yes | Global | No |
| [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) | Yes | Yes | Yes | Global | Yes |
| [**log\_slow\_extra**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_extra) | Yes | Yes | Yes | Global | Yes |
| [**log\_slow\_slave\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slow_slave_statements) | Yes | Yes | Yes | Global | Yes |
| [**log\_statements\_unsafe\_for\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_statements_unsafe_for_binlog) | Yes | Yes | Yes | Global | Yes |
| [**log\_syslog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog) | Yes | Yes | Yes | Global | Yes |
| [**log\_syslog\_facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_facility) | Yes | Yes | Yes | Global | Yes |
| [**log\_syslog\_include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_include_pid) | Yes | Yes | Yes | Global | Yes |
| [**log\_syslog\_tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_tag) | Yes | Yes | Yes | Global | Yes |
| [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) | Yes | Yes | Yes | Global | Yes |
| [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) | Yes | Yes | Yes | Global | Yes |
| [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) | Yes | Yes | Yes | Both | Yes |
| [**low\_priority\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_low_priority_updates) | Yes | Yes | Yes | Both | Yes |
| [**lower\_case\_file\_system**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_file_system) |  |  | Yes | Global | No |
| [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) | Yes | Yes | Yes | Global | No |
| [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) | Yes | Yes | Yes | Global | Yes |
| [**master\_info\_repository**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_info_repository) | Yes | Yes | Yes | Global | Yes |
| [**master\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_verify_checksum) | Yes | Yes | Yes | Global | Yes |
| [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) | Yes | Yes | Yes | Both | Yes |
| [**max\_binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size) | Yes | Yes | Yes | Global | Yes |
| [**max\_binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_stmt_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) | Yes | Yes | Yes | Global | Yes |
| [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) | Yes | Yes | Yes | Global | Yes |
| [**max\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_delayed_threads) | Yes | Yes | Yes | Both | Yes |
| [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length) | Yes | Yes | Yes | Global | No |
| [**max\_error\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_error_count) | Yes | Yes | Yes | Both | Yes |
| [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) | Yes | Yes | Yes | Both | Yes |
| [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size) | Yes | Yes | Yes | Both | Yes |
| [**max\_insert\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_insert_delayed_threads) |  |  | Yes | Both | Yes |
| [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) | Yes | Yes | Yes | Both | Yes |
| [**max\_length\_for\_sort\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_length_for_sort_data) | Yes | Yes | Yes | Both | Yes |
| [**max\_points\_in\_geometry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_points_in_geometry) | Yes | Yes | Yes | Both | Yes |
| [**max\_prepared\_stmt\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_prepared_stmt_count) | Yes | Yes | Yes | Global | Yes |
| [**max\_relay\_log\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_relay_log_size) | Yes | Yes | Yes | Global | Yes |
| [**max\_seeks\_for\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_seeks_for_key) | Yes | Yes | Yes | Both | Yes |
| [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) | Yes | Yes | Yes | Both | Yes |
| [**max\_sp\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sp_recursion_depth) | Yes | Yes | Yes | Both | Yes |
| [**max\_user\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_user_connections) | Yes | Yes | Yes | Both | Yes |
| [**max\_write\_lock\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_write_lock_count) | Yes | Yes | Yes | Global | Yes |
| [**mecab\_rc\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mecab_rc_file) | Yes | Yes | Yes | Global | No |
| [**metadata\_locks\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_metadata_locks_cache_size) | Yes | Yes | Yes | Global | No |
| [**metadata\_locks\_hash\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_metadata_locks_hash_instances) | Yes | Yes | Yes | Global | No |
| [**min\_examined\_row\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_min_examined_row_limit) | Yes | Yes | Yes | Both | Yes |
| [**myisam\_data\_pointer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_data_pointer_size) | Yes | Yes | Yes | Global | Yes |
| [**myisam\_max\_sort\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_max_sort_file_size) | Yes | Yes | Yes | Global | Yes |
| [**myisam\_mmap\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_mmap_size) | Yes | Yes | Yes | Global | No |
| [**myisam\_recover\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_recover_options) | Yes | Yes | Yes | Global | No |
| [**myisam\_repair\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_repair_threads) | Yes | Yes | Yes | Both | Yes |
| [**myisam\_sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_sort_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**myisam\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_stats_method) | Yes | Yes | Yes | Both | Yes |
| [**myisam\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_use_mmap) | Yes | Yes | Yes | Global | Yes |
| [**mysql\_firewall\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_mysql_firewall_mode) | Yes | Yes | Yes | Global | Yes |
| [**mysql\_firewall\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_mysql_firewall_trace) | Yes | Yes | Yes | Global | Yes |
| [**mysql\_native\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mysql_native_password_proxy_users) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_bind_address) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_compression_algorithms) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_connect_timeout) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_deflate\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_deflate_default_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_deflate\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_deflate_max_client_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_document\_id\_unique\_prefix**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_document_id_unique_prefix) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_enable\_hello\_notice**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_enable_hello_notice) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_idle\_worker\_thread\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_idle_worker_thread_timeout) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_interactive_timeout) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_lz4\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_lz4_default_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_lz4\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_lz4_max_client_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_max_allowed_packet) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_max_connections) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_min\_worker\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_min_worker_threads) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_port) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_port\_open\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_port_open_timeout) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_read_timeout) | Yes | Yes | Yes | Session | Yes |
| [**mysqlx\_socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_socket) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_ca) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_capath) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_cert) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_cipher) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_crl) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_crlpath) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_ssl_key) | Yes | Yes | Yes | Global | No |
| [**mysqlx\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_wait_timeout) | Yes | Yes | Yes | Session | Yes |
| [**mysqlx\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_write_timeout) | Yes | Yes | Yes | Session | Yes |
| [**mysqlx\_zstd\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_zstd_default_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**mysqlx\_zstd\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_zstd_max_client_compression_level) | Yes | Yes | Yes | Global | Yes |
| [**named\_pipe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe) | Yes | Yes | Yes | Global | No |
| [**named\_pipe\_full\_access\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe_full_access_group) | Yes | Yes | Yes | Global | No |
| [**ndb\_allow\_copying\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-allow-copying-alter-table) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_autoincrement\_prefetch\_sz**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_autoincrement_prefetch_sz) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-batch-size) | Yes | Yes | Yes | Global | No |
| [**ndb\_blob\_read\_batch\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-blob-read-batch-bytes) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_blob\_write\_batch\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-blob-write-batch-bytes) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_cache\_check\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_cache_check_time) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_clear\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_clear_apply_status) | Yes |  | Yes | Global | Yes |
| [**ndb\_cluster\_connection\_pool**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-cluster-connection-pool) | Yes | Yes | Yes | Global | No |
| [**ndb\_cluster\_connection\_pool\_nodeids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-cluster-connection-pool-nodeids) | Yes | Yes | Yes | Global | No |
| [**Ndb\_conflict\_last\_conflict\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_last_conflict_epoch) |  |  | Yes | Global | No |
| [**ndb\_conflict\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_conflict_role) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_data\_node\_neighbour**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_data_node_neighbour) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_dbg\_check\_shares**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_dbg_check_shares) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_default\_column\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-default-column-format) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_default\_column\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_default_column_format) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_deferred\_constraints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-deferred-constraints) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_deferred\_constraints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_deferred_constraints) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_distribution**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-distribution) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_distribution**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_distribution) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_eventbuffer\_free\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_eventbuffer_free_percent) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_eventbuffer\_max\_alloc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_eventbuffer_max_alloc) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_extra\_logging**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_extra_logging) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_force\_send**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_force_send) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_fully\_replicated**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_fully_replicated) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_index\_stat\_enable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_index_stat_enable) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_index\_stat\_option**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_index_stat_option) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_join\_pushdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_join_pushdown) |  |  | Yes | Both | Yes |
| [**ndb\_log\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-apply-status) | Yes | Yes | Yes | Global | No |
| [**ndb\_log\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_apply_status) | Yes | Yes | Yes | Global | No |
| [**ndb\_log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_bin) | Yes |  | Yes | Both | No |
| [**ndb\_log\_binlog\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_binlog_index) | Yes |  | Yes | Global | Yes |
| [**ndb\_log\_empty\_epochs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-empty-epochs) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_log\_empty\_epochs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_epochs) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_log\_empty\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-empty-update) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_log\_empty\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_update) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_log\_exclusive\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-exclusive-reads) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_log\_exclusive\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_exclusive_reads) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_log\_fail\_terminate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-fail-terminate) | Yes | Yes | Yes | Global | No |
| [**ndb\_log\_orig**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-orig) | Yes | Yes | Yes | Global | No |
| [**ndb\_log\_orig**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_orig) | Yes | Yes | Yes | Global | No |
| [**ndb\_log\_transaction\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-transaction-id) | Yes | Yes | Yes | Global | No |
| [**ndb\_log\_transaction\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_transaction_id) |  |  | Yes | Global | No |
| [**ndb\_log\_update\_as\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-update-as-write) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_log\_update\_minimal**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-update-minimal) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_log\_updated\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-log-updated-only) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_metadata\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_check) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_metadata\_check\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_check_interval) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_metadata\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_sync) |  |  | Yes | Global | Yes |
| [**ndb\_optimization\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-optimization-delay) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_optimized\_node\_selection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_optimized_node_selection) | Yes | Yes | Yes | Global | No |
| [**ndb\_read\_backup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_read_backup) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_recv\_thread\_activation\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_recv_thread_activation_threshold) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_recv\_thread\_cpu\_mask**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_recv_thread_cpu_mask) | Yes | Yes | Yes | Global | Yes |
| [**Ndb\_replica\_max\_replicated\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_replica_max_replicated_epoch) |  |  | Yes | Global | No |
| [**ndb\_report\_thresh\_binlog\_epoch\_slip**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_report_thresh_binlog_epoch_slip) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_report\_thresh\_binlog\_mem\_usage**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_report_thresh_binlog_mem_usage) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_row\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_row_checksum) |  |  | Yes | Both | Yes |
| [**ndb\_schema\_dist\_lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_lock_wait_timeout) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_schema\_dist\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-schema-dist-timeout) | Yes | Yes | Yes | Global | No |
| [**ndb\_schema\_dist\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_timeout) | Yes | Yes | Yes | Global | No |
| [**ndb\_schema\_dist\_upgrade\_allowed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_upgrade_allowed) | Yes | Yes | Yes | Global | No |
| [**ndb\_show\_foreign\_key\_mock\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_show_foreign_key_mock_tables) | Yes | Yes | Yes | Global | Yes |
| [**ndb\_slave\_conflict\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_slave_conflict_role) | Yes | Yes | Yes | Global | Yes |
| [**Ndb\_slave\_max\_replicated\_epoch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_slave_max_replicated_epoch) |  |  | Yes | Global | No |
| [**Ndb\_system\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_system_name) |  |  | Yes | Global | No |
| [**ndb\_table\_no\_logging**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_table_no_logging) |  |  | Yes | Session | Yes |
| [**ndb\_table\_temporary**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_table_temporary) |  |  | Yes | Session | Yes |
| [**ndb\_use\_copying\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_copying_alter_table) |  |  | Yes | Both | No |
| [**ndb\_use\_exact\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_exact_count) |  |  | Yes | Both | Yes |
| [**ndb\_use\_transactions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_transactions) | Yes | Yes | Yes | Both | Yes |
| [**ndb\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_version) |  |  | Yes | Global | No |
| [**ndb\_version\_string**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_version_string) |  |  | Yes | Global | No |
| [**ndb\_wait\_connected**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-wait-connected) | Yes | Yes | Yes | Global | No |
| [**ndb\_wait\_setup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndb-wait-setup) | Yes | Yes | Yes | Global | No |
| [**ndbinfo\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_database) |  |  | Yes | Global | No |
| [**ndbinfo\_max\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_max_bytes) | Yes |  | Yes | Both | Yes |
| [**ndbinfo\_max\_rows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_max_rows) | Yes |  | Yes | Both | Yes |
| [**ndbinfo\_offline**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_offline) |  |  | Yes | Global | Yes |
| [**ndbinfo\_show\_hidden**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_show_hidden) | Yes |  | Yes | Both | Yes |
| [**ndbinfo\_table\_prefix**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_table_prefix) |  |  | Yes | Global | No |
| [**ndbinfo\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_version) |  |  | Yes | Global | No |
| [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) | Yes | Yes | Yes | Both | Yes |
| [**net\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_read_timeout) | Yes | Yes | Yes | Both | Yes |
| [**net\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_retry_count) | Yes | Yes | Yes | Both | Yes |
| [**net\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_write_timeout) | Yes | Yes | Yes | Both | Yes |
| [**new**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_new) | Yes | Yes | Yes | Both | Yes |
| [**ngram\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ngram_token_size) | Yes | Yes | Yes | Global | No |
| [**offline\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_offline_mode) | Yes | Yes | Yes | Global | Yes |
| [**old**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old) | Yes | Yes | Yes | Global | No |
| [**old\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old_alter_table) | Yes | Yes | Yes | Both | Yes |
| [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) | Yes | Yes | Yes | Global | No |
| [**optimizer\_prune\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_prune_level) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_search\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_search_depth) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_switch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_switch) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_trace\_features**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_features) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_trace\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_limit) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_trace\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_max_mem_size) | Yes | Yes | Yes | Both | Yes |
| [**optimizer\_trace\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_offset) | Yes | Yes | Yes | Both | Yes |
| [**original\_commit\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_commit_timestamp) |  |  | Yes | Session | Yes |
| [**original\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_server_version) |  |  | Yes | Session | Yes |
| [**parser\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_parser_max_mem_size) | Yes | Yes | Yes | Both | Yes |
| [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) | Yes | Yes | Yes | Global | Yes |
| [**password\_history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_history) | Yes | Yes | Yes | Global | Yes |
| [**password\_require\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_require_current) | Yes | Yes | Yes | Global | Yes |
| [**password\_reuse\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_reuse_interval) | Yes | Yes | Yes | Global | Yes |
| [**performance\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_accounts\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_accounts_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_digests\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_digests_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_error\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_error_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_stages\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_stages_history_long_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_stages\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_stages_history_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_statements\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_statements_history_long_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_statements\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_statements_history_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_transactions\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_transactions_history_long_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_transactions\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_transactions_history_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_waits\_history\_long\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_waits_history_long_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_events\_waits\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_events_waits_history_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_hosts\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_hosts_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_cond\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_cond_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_cond\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_cond_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_length) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_digest\_sample\_age**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_sample_age) | Yes | Yes | Yes | Global | Yes |
| [**performance\_schema\_max\_file\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_file_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_file\_handles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_file_handles) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_file\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_file_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_index\_stat**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_index_stat) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_memory\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_memory_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_metadata\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_metadata_locks) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_mutex\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_mutex_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_mutex\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_mutex_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_prepared\_statements\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_prepared_statements_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_program\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_program_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_rwlock\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_rwlock_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_rwlock\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_rwlock_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_socket\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_socket_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_socket\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_socket_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_sql\_text\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_sql_text_length) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_stage\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_stage_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_statement\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_statement_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_statement\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_statement_stack) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_table\_handles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_table_handles) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_table\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_table_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_table\_lock\_stat**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_table_lock_stat) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_thread\_classes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_thread_classes) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_max\_thread\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_thread_instances) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_session\_connect\_attrs\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_session_connect_attrs_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_setup\_actors\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_setup_actors_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_setup\_objects\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_setup_objects_size) | Yes | Yes | Yes | Global | No |
| [**performance\_schema\_show\_processlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_show_processlist) | Yes | Yes | Yes | Global | Yes |
| [**performance\_schema\_users\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_users_size) | Yes | Yes | Yes | Global | No |
| [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) | Yes | Yes | Yes | Global | No |
| [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load) | Yes | Yes | Yes | Global | No |
| [**pid\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file) | Yes | Yes | Yes | Global | No |
| [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) | Yes | Yes | Yes | Global | No |
| [**plugin\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) | Yes | Yes | Yes | Global | No |
| [**plugin\_load\_add**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) | Yes | Yes | Yes | Global | No |
| [**port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_port) | Yes | Yes | Yes | Global | No |
| [**preload\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_preload_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**print\_identified\_with\_as\_hex**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_print_identified_with_as_hex) | Yes | Yes | Yes | Both | Yes |
| [**profiling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling) |  |  | Yes | Both | Yes |
| [**profiling\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling_history_size) | Yes | Yes | Yes | Both | Yes |
| [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) | Yes | Yes | Yes | Global | Yes |
| [**protocol\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_version) |  |  | Yes | Global | No |
| [**proxy\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_proxy_user) |  |  | Yes | Session | No |
| [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) |  |  | Yes | Session | Yes |
| [**pseudo\_thread\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_thread_id) |  |  | Yes | Session | Yes |
| [**query\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_alloc_block_size) | Yes | Yes | Yes | Both | Yes |
| [**query\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_prealloc_size) | Yes | Yes | Yes | Both | Yes |
| [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1) |  |  | Yes | Session | Yes |
| [**rand\_seed2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed2) |  |  | Yes | Session | Yes |
| [**range\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_alloc_block_size) | Yes | Yes | Yes | Both | Yes |
| [**range\_optimizer\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_optimizer_max_mem_size) | Yes | Yes | Yes | Both | Yes |
| [**rbr\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rbr_exec_mode) |  |  | Yes | Both | Yes |
| [**read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) | Yes | Yes | Yes | Global | Yes |
| [**read\_rnd\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_rnd_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**regexp\_stack\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_stack_limit) | Yes | Yes | Yes | Global | Yes |
| [**regexp\_time\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_time_limit) | Yes | Yes | Yes | Global | Yes |
| [**relay\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log) | Yes | Yes | Yes | Global | No |
| [**relay\_log\_basename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_basename) |  |  | Yes | Global | No |
| [**relay\_log\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_index) | Yes | Yes | Yes | Global | No |
| [**relay\_log\_info\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_info_file) | Yes | Yes | Yes | Global | No |
| [**relay\_log\_info\_repository**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_info_repository) | Yes | Yes | Yes | Global | Yes |
| [**relay\_log\_purge**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_purge) | Yes | Yes | Yes | Global | Yes |
| [**relay\_log\_recovery**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_recovery) | Yes | Yes | Yes | Global | No |
| [**relay\_log\_space\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_space_limit) | Yes | Yes | Yes | Global | No |
| [**replication\_optimize\_for\_static\_plugin\_config**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_replication_optimize_for_static_plugin_config) | Yes | Yes | Yes | Global | Yes |
| [**replication\_sender\_observe\_commit\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_replication_sender_observe_commit_only) | Yes | Yes | Yes | Global | Yes |
| [**report\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_host) | Yes | Yes | Yes | Global | No |
| [**report\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_password) | Yes | Yes | Yes | Global | No |
| [**report\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_port) | Yes | Yes | Yes | Global | No |
| [**report\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_report_user) | Yes | Yes | Yes | Global | No |
| [**require\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_row_format) |  |  | Yes | Session | Yes |
| [**require\_secure\_transport**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_secure_transport) | Yes | Yes | Yes | Global | Yes |
| [**resultset\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_resultset_metadata) |  |  | Yes | Session | Yes |
| [**rewriter\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_enabled) |  |  | Yes | Global | Yes |
| [**rewriter\_verbose**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_verbose) |  |  | Yes | Global | Yes |
| [**rpl\_read\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_read_size) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_master\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_enabled) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_master\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_timeout) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_master\_trace\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_trace_level) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_master\_wait\_for\_slave\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_for_slave_count) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_master\_wait\_no\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_no_slave) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_master\_wait\_point**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_point) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_slave\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_slave_enabled) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_semi\_sync\_slave\_trace\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_slave_trace_level) | Yes | Yes | Yes | Global | Yes |
| [**rpl\_stop\_slave\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_stop_slave_timeout) | Yes | Yes | Yes | Global | Yes |
| [**schema\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_schema_definition_cache) | Yes | Yes | Yes | Global | Yes |
| [**secondary\_engine\_cost\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secondary_engine_cost_threshold) |  |  | Yes | Session | Yes |
| [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) | Yes | Yes | Yes | Global | No |
| [**select\_into\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**select\_into\_disk\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync) | Yes | Yes | Yes | Both | Yes |
| [**select\_into\_disk\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync_delay) | Yes | Yes | Yes | Both | Yes |
| [**server\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_id) | Yes | Yes | Yes | Global | Yes |
| [**server\_id\_bits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_server_id_bits) | Yes | Yes | Yes | Global | No |
| [**server\_uuid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_uuid) |  |  | Yes | Global | No |
| [**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) | Yes | Yes | Yes | Both | Yes |
| [**session\_track\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_schema) | Yes | Yes | Yes | Both | Yes |
| [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) | Yes | Yes | Yes | Both | Yes |
| [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) | Yes | Yes | Yes | Both | Yes |
| [**session\_track\_transaction\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_transaction_info) | Yes | Yes | Yes | Both | Yes |
| [**sha256\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_auto_generate_rsa_keys) | Yes | Yes | Yes | Global | No |
| [**sha256\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_private_key_path) | Yes | Yes | Yes | Global | No |
| [**sha256\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_proxy_users) | Yes | Yes | Yes | Global | Yes |
| [**sha256\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_public_key_path) | Yes | Yes | Yes | Global | No |
| [**shared\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory) | Yes | Yes | Yes | Global | No |
| [**shared\_memory\_base\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory_base_name) | Yes | Yes | Yes | Global | No |
| [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) | Yes | Yes | Yes | Session | Yes |
| [**show\_create\_table\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_verbosity) | Yes | Yes | Yes | Both | Yes |
| [**show\_old\_temporals**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_old_temporals) | Yes | Yes | Yes | Both | Yes |
| [**skip\_external\_locking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_external_locking) | Yes | Yes | Yes | Global | No |
| [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) | Yes | Yes | Yes | Global | No |
| [**skip\_networking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_networking) | Yes | Yes | Yes | Global | No |
| [**skip\_show\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-show-database) | Yes | Yes | Yes | Global | No |
| [**skip\_slave\_start**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_skip-slave-start) | Yes | Yes | Yes | Global | No |
| [**slave\_allow\_batching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_slave_allow_batching) | Yes | Yes | Yes | Global | Yes |
| [**slave\_checkpoint\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_checkpoint_group) | Yes | Yes | Yes | Global | Yes |
| [**slave\_checkpoint\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_checkpoint_period) | Yes | Yes | Yes | Global | Yes |
| [**slave\_compressed\_protocol**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_compressed_protocol) | Yes | Yes | Yes | Global | Yes |
| [**slave\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_exec_mode) | Yes | Yes | Yes | Global | Yes |
| [**slave\_load\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_load_tmpdir) | Yes | Yes | Yes | Global | No |
| [**slave\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_max_allowed_packet) | Yes | Yes | Yes | Global | Yes |
| [**slave\_net\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_net_timeout) | Yes | Yes | Yes | Global | Yes |
| [**slave\_parallel\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_type) | Yes | Yes | Yes | Global | Yes |
| [**slave\_parallel\_workers**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_workers) | Yes | Yes | Yes | Global | Yes |
| [**slave\_pending\_jobs\_size\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_pending_jobs_size_max) | Yes | Yes | Yes | Global | Yes |
| [**slave\_preserve\_commit\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_preserve_commit_order) | Yes | Yes | Yes | Global | Yes |
| [**slave\_rows\_search\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_rows_search_algorithms) | Yes | Yes | Yes | Global | Yes |
| [**slave\_skip\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_slave-skip-errors) | Yes | Yes | Yes | Global | No |
| [**slave\_sql\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_sql_verify_checksum) | Yes | Yes | Yes | Global | Yes |
| [**slave\_transaction\_retries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_transaction_retries) | Yes | Yes | Yes | Global | Yes |
| [**slave\_type\_conversions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_type_conversions) | Yes | Yes | Yes | Global | Yes |
| [**slow\_launch\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_launch_time) | Yes | Yes | Yes | Global | Yes |
| [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) | Yes | Yes | Yes | Global | Yes |
| [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) | Yes | Yes | Yes | Global | Yes |
| [**socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_socket) | Yes | Yes | Yes | Global | No |
| [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) | Yes | Yes | Yes | Both | Yes |
| [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null) |  |  | Yes | Both | Yes |
| [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) |  |  | Yes | Both | Yes |
| [**sql\_buffer\_result**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_buffer_result) |  |  | Yes | Both | Yes |
| [**sql\_log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_log_bin) |  |  | Yes | Session | Yes |
| [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) |  |  | Yes | Both | Yes |
| [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) | Yes | Yes | Yes | Both | Yes |
| [**sql\_notes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_notes) |  |  | Yes | Both | Yes |
| [**sql\_quote\_show\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_quote_show_create) |  |  | Yes | Both | Yes |
| [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) | Yes | Yes | Yes | Both | Yes |
| [**sql\_safe\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_safe_updates) |  |  | Yes | Both | Yes |
| [**sql\_select\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_select_limit) |  |  | Yes | Both | Yes |
| [**sql\_slave\_skip\_counter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_slave_skip_counter) |  |  | Yes | Global | Yes |
| [**sql\_warnings**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_warnings) |  |  | Yes | Both | Yes |
| [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca) | Yes | Yes | Yes | Global | Varies |
| [**ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_capath) | Yes | Yes | Yes | Global | Varies |
| [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) | Yes | Yes | Yes | Global | Varies |
| [**ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cipher) | Yes | Yes | Yes | Global | Varies |
| [**ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crl) | Yes | Yes | Yes | Global | Varies |
| [**ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crlpath) | Yes | Yes | Yes | Global | Varies |
| [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) | Yes | Yes | Yes | Global | Yes |
| [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key) | Yes | Yes | Yes | Global | Varies |
| [**stored\_program\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_cache) | Yes | Yes | Yes | Global | Yes |
| [**stored\_program\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_definition_cache) | Yes | Yes | Yes | Global | Yes |
| [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) | Yes | Yes | Yes | Global | Yes |
| [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) | Yes | Yes | Yes | Global | Yes |
| [**sync\_master\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_master_info) | Yes | Yes | Yes | Global | Yes |
| [**sync\_relay\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_relay_log) | Yes | Yes | Yes | Global | Yes |
| [**sync\_relay\_log\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_relay_log_info) | Yes | Yes | Yes | Global | Yes |
| [**syseventlog.facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.facility) | Yes | Yes | Yes | Global | Yes |
| [**syseventlog.include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.include_pid) | Yes | Yes | Yes | Global | Yes |
| [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag) | Yes | Yes | Yes | Global | Yes |
| [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone) |  |  | Yes | Global | No |
| [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) | Yes | Yes | Yes | Global | Yes |
| [**table\_encryption\_privilege\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_encryption_privilege_check) | Yes | Yes | Yes | Global | Yes |
| [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) | Yes | Yes | Yes | Global | Yes |
| [**table\_open\_cache\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache_instances) | Yes | Yes | Yes | Global | No |
| [**tablespace\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tablespace_definition_cache) | Yes | Yes | Yes | Global | Yes |
| [**temptable\_max\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_mmap) | Yes | Yes | Yes | Global | Yes |
| [**temptable\_max\_ram**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_ram) | Yes | Yes | Yes | Global | Yes |
| [**temptable\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_use_mmap) | Yes | Yes | Yes | Global | Yes |
| [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) | Yes | Yes | Yes | Global | Yes |
| [**thread\_handling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_handling) | Yes | Yes | Yes | Global | No |
| [**thread\_pool\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_algorithm) | Yes | Yes | Yes | Global | No |
| [**thread\_pool\_high\_priority\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_high_priority_connection) | Yes | Yes | Yes | Both | Yes |
| [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads) | Yes | Yes | Yes | Global | Yes |
| [**thread\_pool\_max\_unused\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_unused_threads) | Yes | Yes | Yes | Global | Yes |
| [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer) | Yes | Yes | Yes | Global | Yes |
| [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) | Yes | Yes | Yes | Global | No |
| [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) | Yes | Yes | Yes | Global | Yes |
| [**thread\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_stack) | Yes | Yes | Yes | Global | No |
| [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) |  |  | Yes | Both | Yes |
| [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) |  |  | Yes | Session | Yes |
| [**tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_ciphersuites) | Yes | Yes | Yes | Global | Yes |
| [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version) | Yes | Yes | Yes | Global | Varies |
| [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) | Yes | Yes | Yes | Both | Yes |
| [**tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_tmpdir) | Yes | Yes | Yes | Global | No |
| [**transaction\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_alloc_block_size) | Yes | Yes | Yes | Both | Yes |
| [**transaction\_allow\_batching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_transaction_allow_batching) |  |  | Yes | Session | Yes |
| [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_transaction-isolation) | Yes | Yes | Yes | Both | Yes |
| [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size) | Yes | Yes | Yes | Both | Yes |
| [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_transaction-read-only) | Yes | Yes | Yes | Both | Yes |
| [**transaction\_write\_set\_extraction**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_transaction_write_set_extraction) | Yes | Yes | Yes | Both | Yes |
| [**unique\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_unique_checks) |  |  | Yes | Both | Yes |
| [**updatable\_views\_with\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_updatable_views_with_limit) | Yes | Yes | Yes | Both | Yes |
| [**use\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_use_secondary_engine) |  |  | Yes | Session | Yes |
| [**validate\_password\_check\_user\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_check_user_name) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password\_dictionary\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_dictionary_file) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_length) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password\_mixed\_case\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_mixed_case_count) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password\_number\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_number_count) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_policy) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password\_special\_char\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_special_char_count) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.check\_user\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.check_user_name) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.dictionary\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.dictionary_file) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.length) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.mixed\_case\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.mixed_case_count) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.number\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.number_count) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.policy) | Yes | Yes | Yes | Global | Yes |
| [**validate\_password.special\_char\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.special_char_count) | Yes | Yes | Yes | Global | Yes |
| [**version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version) |  |  | Yes | Global | No |
| [**version\_comment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_comment) |  |  | Yes | Global | No |
| [**version\_compile\_machine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_machine) |  |  | Yes | Global | No |
| [**version\_compile\_os**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_os) |  |  | Yes | Global | No |
| [**version\_compile\_zlib**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_zlib) |  |  | Yes | Global | No |
| [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) | Yes | Yes | Yes | Both | Yes |
| [**version\_tokens\_session\_number**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session_number) | Yes | Yes | Yes | Both | No |
| [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) | Yes | Yes | Yes | Both | Yes |
| [**warning\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_warning_count) |  |  | Yes | Session | No |
| [**windowing\_use\_high\_precision**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_windowing_use_high_precision) | Yes | Yes | Yes | Both | Yes |

***Notes:***

1. This option is dynamic, but should be set only by server. You should not set this variable manually.

### 5.1.6服务端状态码参考

The following table lists all status variables applicable within **mysqld**.

The table lists each variable's data type and scope. The last column indicates whether the scope for each variable is Global, Session, or both. Please see the corresponding item descriptions for details on setting and using the variables. Where appropriate, direct links to further information about the items are provided.

**Table 5.3 Status Variable Summary**

|  |  |  |
| --- | --- | --- |
| Variable Name | Variable Type | Variable Scope |
| [Aborted\_clients](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Aborted_clients) | Integer | Global |
| [Aborted\_connects](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Aborted_connects) | Integer | Global |
| [Acl\_cache\_items\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Acl_cache_items_count) | Integer | Global |
| [Audit\_log\_current\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_current_size) | Integer | Global |
| [Audit\_log\_event\_max\_drop\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_event_max_drop_size) | Integer | Global |
| [Audit\_log\_events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events) | Integer | Global |
| [Audit\_log\_events\_filtered](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events_filtered) | Integer | Global |
| [Audit\_log\_events\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events_lost) | Integer | Global |
| [Audit\_log\_events\_written](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_events_written) | Integer | Global |
| [Audit\_log\_total\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_total_size) | Integer | Global |
| [Audit\_log\_write\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Audit_log_write_waits) | Integer | Global |
| [Authentication\_ldap\_sasl\_supported\_methods](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Authentication_ldap_sasl_supported_methods) | String | Global |
| [Binlog\_cache\_disk\_use](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_cache_disk_use) | Integer | Global |
| [Binlog\_cache\_use](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_cache_use) | Integer | Global |
| [Binlog\_stmt\_cache\_disk\_use](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_stmt_cache_disk_use) | Integer | Global |
| [Binlog\_stmt\_cache\_use](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_stmt_cache_use) | Integer | Global |
| [Bytes\_received](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Bytes_received) | Integer | Both |
| [Bytes\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Bytes_sent) | Integer | Both |
| [Caching\_sha2\_password\_rsa\_public\_key](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Caching_sha2_password_rsa_public_key) | String | Global |
| [Com\_admin\_commands](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_event](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_function](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_procedure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_resource\_group](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_alter\_server](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_tablespace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_alter\_user\_default\_role](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_analyze](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_assign\_to\_keycache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_begin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_binlog](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_call\_procedure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_change\_db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_change\_master](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_change\_repl\_filter](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_check](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_checksum](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_clone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_commit](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_event](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_function](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_index](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_procedure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_resource\_group](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_create\_role](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_create\_server](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_trigger](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_udf](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_create\_view](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_dealloc\_sql](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_delete](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_delete\_multi](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_do](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_event](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_function](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_index](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_procedure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_resource\_group](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_drop\_role](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_drop\_server](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_trigger](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_drop\_view](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_empty\_query](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_execute\_sql](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_explain\_other](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_flush](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_get\_diagnostics](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_grant](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_grant\_roles](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_group\_replication\_start](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_group\_replication\_stop](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_ha\_close](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_ha\_open](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_ha\_read](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_help](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_insert](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_insert\_select](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_install\_component](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_install\_plugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_kill](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_lock\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_optimize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_preload\_keys](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_prepare\_sql](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_purge](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_purge\_before\_date](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_release\_savepoint](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_rename\_table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_rename\_user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_repair](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_replace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_replace\_select](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_replica\_start](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_replica\_stop](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_reset](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_resignal](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_restart](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_revoke](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_revoke\_all](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_revoke\_roles](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_rollback](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_rollback\_to\_savepoint](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_savepoint](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_select](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_set\_option](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_set\_resource\_group](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_set\_role](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_show\_authors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_binlog\_events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_binlogs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_charsets](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_collations](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_contributors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_event](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_func](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_proc](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_trigger](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_create\_user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_databases](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_engine\_logs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_engine\_mutex](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_engine\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_errors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_fields](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_function\_code](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_function\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_grants](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_keys](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_master\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_ndb\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_open\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_plugins](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_privileges](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_procedure\_code](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_procedure\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_processlist](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_profile](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_profiles](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_relaylog\_events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_replica\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_replicas](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_slave\_hosts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_slave\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_storage\_engines](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_table\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_triggers](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_show\_warnings](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_shutdown](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_signal](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_slave\_start](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_slave\_stop](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_close](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_execute](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_fetch](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_prepare](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_reprepare](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_reset](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_stmt\_send\_long\_data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_truncate](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_uninstall\_component](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Global |
| [Com\_uninstall\_plugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_unlock\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_update](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_update\_multi](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_xa\_commit](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_xa\_end](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_xa\_prepare](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_xa\_recover](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_xa\_rollback](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Com\_xa\_start](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) | Integer | Both |
| [Compression](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Compression) | Integer | Session |
| [Compression\_algorithm](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Compression_algorithm) | String | Global |
| [Compression\_level](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Compression_level) | Integer | Global |
| [Connection\_control\_delay\_generated](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Connection_control_delay_generated) | Integer | Global |
| [Connection\_errors\_accept](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_accept) | Integer | Global |
| [Connection\_errors\_internal](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_internal) | Integer | Global |
| [Connection\_errors\_max\_connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_max_connections) | Integer | Global |
| [Connection\_errors\_peer\_address](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_peer_address) | Integer | Global |
| [Connection\_errors\_select](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_select) | Integer | Global |
| [Connection\_errors\_tcpwrap](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_tcpwrap) | Integer | Global |
| [Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connections) | Integer | Global |
| [Created\_tmp\_disk\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) | Integer | Both |
| [Created\_tmp\_files](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_files) | Integer | Global |
| [Created\_tmp\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) | Integer | Both |
| [Current\_tls\_ca](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca) | File name | Global |
| [Current\_tls\_capath](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_capath) | Directory name | Global |
| [Current\_tls\_cert](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_cert) | File name | Global |
| [Current\_tls\_cipher](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_cipher) | String | Global |
| [Current\_tls\_ciphersuites](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ciphersuites) | String | Global |
| [Current\_tls\_crl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_crl) | File name | Global |
| [Current\_tls\_crlpath](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_crlpath) | Directory name | Global |
| [Current\_tls\_key](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_key) | File name | Global |
| [Current\_tls\_version](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_version) | String | Global |
| [Delayed\_errors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Delayed_errors) | Integer | Global |
| [Delayed\_insert\_threads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Delayed_insert_threads) | Integer | Global |
| [Delayed\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Delayed_writes) | Integer | Global |
| [dragnet.Status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_dragnet.Status) | String | Global |
| [Error\_log\_buffered\_bytes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_buffered_bytes) | Integer | Global |
| [Error\_log\_buffered\_events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_buffered_events) | Integer | Global |
| [Error\_log\_expired\_events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_expired_events) | Integer | Global |
| [Error\_log\_latest\_write](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_latest_write) | Integer | Global |
| [Firewall\_access\_denied](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Firewall_access_denied) | Integer | Global |
| [Firewall\_access\_granted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Firewall_access_granted) | Integer | Global |
| [Firewall\_cached\_entries](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_Firewall_cached_entries) | Integer | Global |
| [Flush\_commands](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Flush_commands) | Integer | Global |
| [group\_replication\_primary\_member](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_group_replication_primary_member) | String | Global |
| [Handler\_commit](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_commit) | Integer | Both |
| [Handler\_delete](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_delete) | Integer | Both |
| [Handler\_discover](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Handler_discover) | Integer | Both |
| [Handler\_external\_lock](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_external_lock) | Integer | Both |
| [Handler\_mrr\_init](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_mrr_init) | Integer | Both |
| [Handler\_prepare](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_prepare) | Integer | Both |
| [Handler\_read\_first](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_first) | Integer | Both |
| [Handler\_read\_key](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_key) | Integer | Both |
| [Handler\_read\_last](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_last) | Integer | Both |
| [Handler\_read\_next](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_next) | Integer | Both |
| [Handler\_read\_prev](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_prev) | Integer | Both |
| [Handler\_read\_rnd](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_rnd) | Integer | Both |
| [Handler\_read\_rnd\_next](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_rnd_next) | Integer | Both |
| [Handler\_rollback](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_rollback) | Integer | Both |
| [Handler\_savepoint](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_savepoint) | Integer | Both |
| [Handler\_savepoint\_rollback](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_savepoint_rollback) | Integer | Both |
| [Handler\_update](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_update) | Integer | Both |
| [Handler\_write](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_write) | Integer | Both |
| [Innodb\_buffer\_pool\_bytes\_data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_bytes_data) | Integer | Global |
| [Innodb\_buffer\_pool\_bytes\_dirty](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_bytes_dirty) | Integer | Global |
| [Innodb\_buffer\_pool\_dump\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_dump_status) | String | Global |
| [Innodb\_buffer\_pool\_load\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_load_status) | String | Global |
| [Innodb\_buffer\_pool\_pages\_data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_data) | Integer | Global |
| [Innodb\_buffer\_pool\_pages\_dirty](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_dirty) | Integer | Global |
| [Innodb\_buffer\_pool\_pages\_flushed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_flushed) | Integer | Global |
| [Innodb\_buffer\_pool\_pages\_free](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_free) | Integer | Global |
| [Innodb\_buffer\_pool\_pages\_latched](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_latched) | Integer | Global |
| [Innodb\_buffer\_pool\_pages\_misc](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_misc) | Integer | Global |
| [Innodb\_buffer\_pool\_pages\_total](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_total) | Integer | Global |
| [Innodb\_buffer\_pool\_read\_ahead](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_ahead) | Integer | Global |
| [Innodb\_buffer\_pool\_read\_ahead\_evicted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_ahead_evicted) | Integer | Global |
| [Innodb\_buffer\_pool\_read\_ahead\_rnd](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_ahead_rnd) | Integer | Global |
| [Innodb\_buffer\_pool\_read\_requests](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_read_requests) | Integer | Global |
| [Innodb\_buffer\_pool\_reads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_reads) | Integer | Global |
| [Innodb\_buffer\_pool\_resize\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_resize_status) | String | Global |
| [Innodb\_buffer\_pool\_wait\_free](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_wait_free) | Integer | Global |
| [Innodb\_buffer\_pool\_write\_requests](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_write_requests) | Integer | Global |
| [Innodb\_data\_fsyncs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_fsyncs) | Integer | Global |
| [Innodb\_data\_pending\_fsyncs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_pending_fsyncs) | Integer | Global |
| [Innodb\_data\_pending\_reads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_pending_reads) | Integer | Global |
| [Innodb\_data\_pending\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_pending_writes) | Integer | Global |
| [Innodb\_data\_read](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_read) | Integer | Global |
| [Innodb\_data\_reads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_reads) | Integer | Global |
| [Innodb\_data\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_writes) | Integer | Global |
| [Innodb\_data\_written](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_data_written) | Integer | Global |
| [Innodb\_dblwr\_pages\_written](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_dblwr_pages_written) | Integer | Global |
| [Innodb\_dblwr\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_dblwr_writes) | Integer | Global |
| [Innodb\_have\_atomic\_builtins](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_have_atomic_builtins) | Integer | Global |
| [Innodb\_log\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_log_waits) | Integer | Global |
| [Innodb\_log\_write\_requests](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_log_write_requests) | Integer | Global |
| [Innodb\_log\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_log_writes) | Integer | Global |
| [Innodb\_num\_open\_files](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_num_open_files) | Integer | Global |
| [Innodb\_os\_log\_fsyncs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_fsyncs) | Integer | Global |
| [Innodb\_os\_log\_pending\_fsyncs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_pending_fsyncs) | Integer | Global |
| [Innodb\_os\_log\_pending\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_pending_writes) | Integer | Global |
| [Innodb\_os\_log\_written](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_os_log_written) | Integer | Global |
| [Innodb\_page\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_page_size) | Integer | Global |
| [Innodb\_pages\_created](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_pages_created) | Integer | Global |
| [Innodb\_pages\_read](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_pages_read) | Integer | Global |
| [Innodb\_pages\_written](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_pages_written) | Integer | Global |
| [Innodb\_redo\_log\_enabled](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_redo_log_enabled) | Boolean | Global |
| [Innodb\_row\_lock\_current\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_current_waits) | Integer | Global |
| [Innodb\_row\_lock\_time](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_time) | Integer | Global |
| [Innodb\_row\_lock\_time\_avg](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_time_avg) | Integer | Global |
| [Innodb\_row\_lock\_time\_max](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_time_max) | Integer | Global |
| [Innodb\_row\_lock\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_row_lock_waits) | Integer | Global |
| [Innodb\_rows\_deleted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_deleted) | Integer | Global |
| [Innodb\_rows\_inserted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_inserted) | Integer | Global |
| [Innodb\_rows\_read](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_read) | Integer | Global |
| [Innodb\_rows\_updated](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_rows_updated) | Integer | Global |
| [Innodb\_system\_rows\_deleted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_system_rows_deleted) | Integer | Global |
| [Innodb\_system\_rows\_inserted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_system_rows_inserted) | Integer | Global |
| [Innodb\_system\_rows\_read](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_system_rows_read) | Integer | Global |
| [Innodb\_truncated\_status\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_truncated_status_writes) | Integer | Global |
| [Innodb\_undo\_tablespaces\_active](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_active) | Integer | Global |
| [Innodb\_undo\_tablespaces\_explicit](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_explicit) | Integer | Global |
| [Innodb\_undo\_tablespaces\_implicit](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_implicit) | Integer | Global |
| [Innodb\_undo\_tablespaces\_total](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_undo_tablespaces_total) | Integer | Global |
| [Key\_blocks\_not\_flushed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_not_flushed) | Integer | Global |
| [Key\_blocks\_unused](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_unused) | Integer | Global |
| [Key\_blocks\_used](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_used) | Integer | Global |
| [Key\_read\_requests](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_read_requests) | Integer | Global |
| [Key\_reads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_reads) | Integer | Global |
| [Key\_write\_requests](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_write_requests) | Integer | Global |
| [Key\_writes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_writes) | Integer | Global |
| [Last\_query\_cost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Last_query_cost) | Numeric | Session |
| [Last\_query\_partial\_plans](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Last_query_partial_plans) | Integer | Session |
| [Locked\_connects](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Locked_connects) | Integer | Global |
| [Max\_execution\_time\_exceeded](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_execution_time_exceeded) | Integer | Both |
| [Max\_execution\_time\_set](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_execution_time_set) | Integer | Both |
| [Max\_execution\_time\_set\_failed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_execution_time_set_failed) | Integer | Both |
| [Max\_used\_connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_used_connections) | Integer | Global |
| [Max\_used\_connections\_time](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_used_connections_time) | Datetime | Global |
| [mecab\_charset](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_mecab_charset) | String | Global |
| [Mysqlx\_aborted\_clients](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_aborted_clients) | Integer | Global |
| [Mysqlx\_address](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_address) | String | Global |
| [Mysqlx\_bytes\_received](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_received) | Integer | Both |
| [Mysqlx\_bytes\_received\_compressed\_payload](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_received_compressed_payload) | Integer | Both |
| [Mysqlx\_bytes\_received\_uncompressed\_frame](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_received_uncompressed_frame) | Integer | Both |
| [Mysqlx\_bytes\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_sent) | Integer | Both |
| [Mysqlx\_bytes\_sent\_compressed\_payload](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_sent_compressed_payload) | Integer | Both |
| [Mysqlx\_bytes\_sent\_uncompressed\_frame](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_bytes_sent_uncompressed_frame) | Integer | Both |
| [Mysqlx\_compression\_algorithm](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_compression_algorithm) | String | Session |
| [Mysqlx\_compression\_level](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_compression_level) | String | Session |
| [Mysqlx\_connection\_accept\_errors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connection_accept_errors) | Integer | Both |
| [Mysqlx\_connection\_errors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connection_errors) | Integer | Both |
| [Mysqlx\_connections\_accepted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connections_accepted) | Integer | Global |
| [Mysqlx\_connections\_closed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connections_closed) | Integer | Global |
| [Mysqlx\_connections\_rejected](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_connections_rejected) | Integer | Global |
| [Mysqlx\_crud\_create\_view](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_create_view) | Integer | Both |
| [Mysqlx\_crud\_delete](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_delete) | Integer | Both |
| [Mysqlx\_crud\_drop\_view](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_drop_view) | Integer | Both |
| [Mysqlx\_crud\_find](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_find) | Integer | Both |
| [Mysqlx\_crud\_insert](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_insert) | Integer | Both |
| [Mysqlx\_crud\_modify\_view](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_modify_view) | Integer | Both |
| [Mysqlx\_crud\_update](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_crud_update) | Integer | Both |
| [Mysqlx\_cursor\_close](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_cursor_close) | Integer | Both |
| [Mysqlx\_cursor\_fetch](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_cursor_fetch) | Integer | Both |
| [Mysqlx\_cursor\_open](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_cursor_open) | Integer | Both |
| [Mysqlx\_errors\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_errors_sent) | Integer | Both |
| Mysqlx\_errors\_unknown\_message\_type | Integer | Both |
| [Mysqlx\_expect\_close](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_expect_close) | Integer | Both |
| [Mysqlx\_expect\_open](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_expect_open) | Integer | Both |
| [Mysqlx\_init\_error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_init_error) | Integer | Both |
| [Mysqlx\_messages\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_messages_sent) | Integer | Both |
| [Mysqlx\_notice\_global\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notice_global_sent) | Integer | Both |
| [Mysqlx\_notice\_other\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notice_other_sent) | Integer | Both |
| [Mysqlx\_notice\_warning\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notice_warning_sent) | Integer | Both |
| [Mysqlx\_notified\_by\_group\_replication](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_notified_by_group_replication) | Integer | Both |
| [Mysqlx\_port](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_port) | String | Global |
| [Mysqlx\_prep\_deallocate](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_prep_deallocate) | Integer | Both |
| [Mysqlx\_prep\_execute](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_prep_execute) | Integer | Both |
| [Mysqlx\_prep\_prepare](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_prep_prepare) | Integer | Both |
| [Mysqlx\_rows\_sent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_rows_sent) | Integer | Both |
| [Mysqlx\_sessions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions) | Integer | Global |
| [Mysqlx\_sessions\_accepted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_accepted) | Integer | Global |
| [Mysqlx\_sessions\_closed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_closed) | Integer | Global |
| [Mysqlx\_sessions\_fatal\_error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_fatal_error) | Integer | Global |
| [Mysqlx\_sessions\_killed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_killed) | Integer | Global |
| [Mysqlx\_sessions\_rejected](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_sessions_rejected) | Integer | Global |
| [Mysqlx\_socket](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_socket) | String | Global |
| [Mysqlx\_ssl\_accept\_renegotiates](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_accept_renegotiates) | Integer | Global |
| [Mysqlx\_ssl\_accepts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_accepts) | Integer | Global |
| [Mysqlx\_ssl\_active](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_active) | Integer | Both |
| [Mysqlx\_ssl\_cipher](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_cipher) | Integer | Both |
| [Mysqlx\_ssl\_cipher\_list](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_cipher_list) | Integer | Both |
| [Mysqlx\_ssl\_ctx\_verify\_depth](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_ctx_verify_depth) | Integer | Both |
| [Mysqlx\_ssl\_ctx\_verify\_mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_ctx_verify_mode) | Integer | Both |
| [Mysqlx\_ssl\_finished\_accepts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_finished_accepts) | Integer | Global |
| [Mysqlx\_ssl\_server\_not\_after](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_server_not_after) | Integer | Global |
| [Mysqlx\_ssl\_server\_not\_before](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_server_not_before) | Integer | Global |
| [Mysqlx\_ssl\_verify\_depth](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_verify_depth) | Integer | Global |
| [Mysqlx\_ssl\_verify\_mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_verify_mode) | Integer | Global |
| [Mysqlx\_ssl\_version](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_ssl_version) | Integer | Both |
| [Mysqlx\_stmt\_create\_collection](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_create_collection) | Integer | Both |
| [Mysqlx\_stmt\_create\_collection\_index](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_create_collection_index) | Integer | Both |
| [Mysqlx\_stmt\_disable\_notices](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_disable_notices) | Integer | Both |
| [Mysqlx\_stmt\_drop\_collection](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_drop_collection) | Integer | Both |
| [Mysqlx\_stmt\_drop\_collection\_index](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_drop_collection_index) | Integer | Both |
| [Mysqlx\_stmt\_enable\_notices](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_enable_notices) | Integer | Both |
| [Mysqlx\_stmt\_ensure\_collection](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_ensure_collection) | String | Both |
| [Mysqlx\_stmt\_execute\_mysqlx](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_execute_mysqlx) | Integer | Both |
| [Mysqlx\_stmt\_execute\_sql](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_execute_sql) | Integer | Both |
| [Mysqlx\_stmt\_execute\_xplugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_execute_xplugin) | Integer | Both |
| [Mysqlx\_stmt\_get\_collection\_options](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_get_collection_options) | Integer | Both |
| [Mysqlx\_stmt\_kill\_client](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_kill_client) | Integer | Both |
| [Mysqlx\_stmt\_list\_clients](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_list_clients) | Integer | Both |
| [Mysqlx\_stmt\_list\_notices](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_list_notices) | Integer | Both |
| [Mysqlx\_stmt\_list\_objects](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_list_objects) | Integer | Both |
| [Mysqlx\_stmt\_modify\_collection\_options](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_modify_collection_options) | Integer | Both |
| [Mysqlx\_stmt\_ping](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_stmt_ping) | Integer | Both |
| [Mysqlx\_worker\_threads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_worker_threads) | Integer | Global |
| [Mysqlx\_worker\_threads\_active](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#statvar_Mysqlx_worker_threads_active) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_deferred\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_deferred\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count_replica) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_deferred\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count_session) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_deferred\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_deferred_count_slave) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_forced\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_forced\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count_replica) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_forced\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count_session) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_forced\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_forced_count_slave) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_unforced\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_unforced\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count_replica) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_unforced\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count_session) | Integer | Global |
| [Ndb\_api\_adaptive\_send\_unforced\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_adaptive_send_unforced_count_slave) | Integer | Global |
| [Ndb\_api\_bytes\_received\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count) | Integer | Global |
| [Ndb\_api\_bytes\_received\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count_replica) | Integer | Global |
| [Ndb\_api\_bytes\_received\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count_session) | Integer | Session |
| [Ndb\_api\_bytes\_received\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_received_count_slave) | Integer | Global |
| [Ndb\_api\_bytes\_sent\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count) | Integer | Global |
| [Ndb\_api\_bytes\_sent\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count_replica) | Integer | Global |
| [Ndb\_api\_bytes\_sent\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count_session) | Integer | Session |
| [Ndb\_api\_bytes\_sent\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_bytes_sent_count_slave) | Integer | Global |
| [Ndb\_api\_event\_bytes\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_bytes_count) | Integer | Global |
| [Ndb\_api\_event\_bytes\_count\_injector](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_bytes_count_injector) | Integer | Global |
| [Ndb\_api\_event\_data\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_data_count) | Integer | Global |
| [Ndb\_api\_event\_data\_count\_injector](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_data_count_injector) | Integer | Global |
| [Ndb\_api\_event\_nondata\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_nondata_count) | Integer | Global |
| [Ndb\_api\_event\_nondata\_count\_injector](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_event_nondata_count_injector) | Integer | Global |
| [Ndb\_api\_pk\_op\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count) | Integer | Global |
| [Ndb\_api\_pk\_op\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count_replica) | Integer | Global |
| [Ndb\_api\_pk\_op\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count_session) | Integer | Session |
| [Ndb\_api\_pk\_op\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pk_op_count_slave) | Integer | Global |
| [Ndb\_api\_pruned\_scan\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count) | Integer | Global |
| [Ndb\_api\_pruned\_scan\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count_replica) | Integer | Global |
| [Ndb\_api\_pruned\_scan\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count_session) | Integer | Session |
| [Ndb\_api\_pruned\_scan\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_pruned_scan_count_slave) | Integer | Global |
| [Ndb\_api\_range\_scan\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count) | Integer | Global |
| [Ndb\_api\_range\_scan\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count_replica) | Integer | Global |
| [Ndb\_api\_range\_scan\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count_session) | Integer | Session |
| [Ndb\_api\_range\_scan\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_range_scan_count_slave) | Integer | Global |
| [Ndb\_api\_read\_row\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count) | Integer | Global |
| [Ndb\_api\_read\_row\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count_replica) | Integer | Global |
| [Ndb\_api\_read\_row\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count_session) | Integer | Session |
| [Ndb\_api\_read\_row\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_read_row_count_slave) | Integer | Global |
| [Ndb\_api\_scan\_batch\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count) | Integer | Global |
| [Ndb\_api\_scan\_batch\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count_replica) | Integer | Global |
| [Ndb\_api\_scan\_batch\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count_session) | Integer | Session |
| [Ndb\_api\_scan\_batch\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_scan_batch_count_slave) | Integer | Global |
| [Ndb\_api\_table\_scan\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count) | Integer | Global |
| [Ndb\_api\_table\_scan\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count_replica) | Integer | Global |
| [Ndb\_api\_table\_scan\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count_session) | Integer | Session |
| [Ndb\_api\_table\_scan\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_table_scan_count_slave) | Integer | Global |
| [Ndb\_api\_trans\_abort\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count) | Integer | Global |
| [Ndb\_api\_trans\_abort\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count_replica) | Integer | Global |
| [Ndb\_api\_trans\_abort\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count_session) | Integer | Session |
| [Ndb\_api\_trans\_abort\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_abort_count_slave) | Integer | Global |
| [Ndb\_api\_trans\_close\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count) | Integer | Global |
| [Ndb\_api\_trans\_close\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count_replica) | Integer | Global |
| [Ndb\_api\_trans\_close\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count_session) | Integer | Session |
| [Ndb\_api\_trans\_close\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_close_count_slave) | Integer | Global |
| [Ndb\_api\_trans\_commit\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count) | Integer | Global |
| [Ndb\_api\_trans\_commit\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count_replica) | Integer | Global |
| [Ndb\_api\_trans\_commit\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count_session) | Integer | Session |
| [Ndb\_api\_trans\_commit\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_commit_count_slave) | Integer | Global |
| [Ndb\_api\_trans\_local\_read\_row\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count) | Integer | Global |
| [Ndb\_api\_trans\_local\_read\_row\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count_replica) | Integer | Global |
| [Ndb\_api\_trans\_local\_read\_row\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count_session) | Integer | Session |
| [Ndb\_api\_trans\_local\_read\_row\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_local_read_row_count_slave) | Integer | Global |
| [Ndb\_api\_trans\_start\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count) | Integer | Global |
| [Ndb\_api\_trans\_start\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count_replica) | Integer | Global |
| [Ndb\_api\_trans\_start\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count_session) | Integer | Session |
| [Ndb\_api\_trans\_start\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_trans_start_count_slave) | Integer | Global |
| [Ndb\_api\_uk\_op\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count) | Integer | Global |
| [Ndb\_api\_uk\_op\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count_replica) | Integer | Global |
| [Ndb\_api\_uk\_op\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count_session) | Integer | Session |
| [Ndb\_api\_uk\_op\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_uk_op_count_slave) | Integer | Global |
| [Ndb\_api\_wait\_exec\_complete\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count) | Integer | Global |
| [Ndb\_api\_wait\_exec\_complete\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count_replica) | Integer | Global |
| [Ndb\_api\_wait\_exec\_complete\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count_session) | Integer | Session |
| [Ndb\_api\_wait\_exec\_complete\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_exec_complete_count_slave) | Integer | Global |
| [Ndb\_api\_wait\_meta\_request\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count) | Integer | Global |
| [Ndb\_api\_wait\_meta\_request\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count_replica) | Integer | Global |
| [Ndb\_api\_wait\_meta\_request\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count_session) | Integer | Session |
| [Ndb\_api\_wait\_meta\_request\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_meta_request_count_slave) | Integer | Global |
| [Ndb\_api\_wait\_nanos\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count) | Integer | Global |
| [Ndb\_api\_wait\_nanos\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count_replica) | Integer | Global |
| [Ndb\_api\_wait\_nanos\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count_session) | Integer | Session |
| [Ndb\_api\_wait\_nanos\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_nanos_count_slave) | Integer | Global |
| [Ndb\_api\_wait\_scan\_result\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count) | Integer | Global |
| [Ndb\_api\_wait\_scan\_result\_count\_replica](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count_replica) | Integer | Global |
| [Ndb\_api\_wait\_scan\_result\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count_session) | Integer | Session |
| [Ndb\_api\_wait\_scan\_result\_count\_slave](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_api_wait_scan_result_count_slave) | Integer | Global |
| [Ndb\_cluster\_node\_id](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_cluster_node_id) | Integer | Global |
| [Ndb\_config\_from\_host](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_config_from_host) | Integer | Both |
| [Ndb\_config\_from\_port](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_config_from_port) | Integer | Both |
| [Ndb\_config\_generation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_config_generation) | Integer | Global |
| [Ndb\_conflict\_fn\_epoch](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch) | Integer | Global |
| [Ndb\_conflict\_fn\_epoch\_trans](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch_trans) | Integer | Global |
| [Ndb\_conflict\_fn\_epoch2](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch2) | Integer | Global |
| [Ndb\_conflict\_fn\_epoch2\_trans](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_epoch2_trans) | Integer | Global |
| [Ndb\_conflict\_fn\_max](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_max) | Integer | Global |
| [Ndb\_conflict\_fn\_old](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_fn_old) | Integer | Global |
| [Ndb\_conflict\_last\_stable\_epoch](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_last_stable_epoch) | Integer | Global |
| [Ndb\_conflict\_reflected\_op\_discard\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_reflected_op_discard_count) | Integer | Global |
| [Ndb\_conflict\_reflected\_op\_prepare\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_reflected_op_prepare_count) | Integer | Global |
| [Ndb\_conflict\_refresh\_op\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_refresh_op_count) | Integer | Global |
| [Ndb\_conflict\_trans\_conflict\_commit\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_conflict_commit_count) | Integer | Global |
| [Ndb\_conflict\_trans\_detect\_iter\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_detect_iter_count) | Integer | Global |
| [Ndb\_conflict\_trans\_reject\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_reject_count) | Integer | Global |
| [Ndb\_conflict\_trans\_row\_conflict\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_row_conflict_count) | Integer | Global |
| [Ndb\_conflict\_trans\_row\_reject\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_conflict_trans_row_reject_count) | Integer | Global |
| [Ndb\_epoch\_delete\_delete\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_epoch_delete_delete_count) | Integer | Global |
| [Ndb\_execute\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_execute_count) | Integer | Global |
| [Ndb\_last\_commit\_epoch\_server](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_last_commit_epoch_server) | Integer | Global |
| [Ndb\_last\_commit\_epoch\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_last_commit_epoch_session) | Integer | Session |
| [Ndb\_metadata\_blacklist\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_excluded_count) | Integer | Global |
| [Ndb\_metadata\_detected\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_detected_count) | Integer | Global |
| [Ndb\_metadata\_excluded\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_excluded_count) | Integer | Global |
| [Ndb\_metadata\_synced\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_metadata_synced_count) | Integer | Global |
| [Ndb\_cluster\_node\_id](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_cluster_node_id) | Integer | Global |
| [Ndb\_number\_of\_data\_nodes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_number_of_data_nodes) | Integer | Global |
| [Ndb\_pruned\_scan\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pruned_scan_count) | Integer | Global |
| [Ndb\_pushed\_queries\_defined](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_queries_defined) | Integer | Global |
| [Ndb\_pushed\_queries\_dropped](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_queries_dropped) | Integer | Global |
| [Ndb\_pushed\_queries\_executed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_queries_executed) | Integer | Global |
| [Ndb\_pushed\_reads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_pushed_reads) | Integer | Global |
| [Ndb\_scan\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_scan_count) | Integer | Global |
| [Ndb\_trans\_hint\_count\_session](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#statvar_Ndb_trans_hint_count_session) | Integer | Both |
| [Not\_flushed\_delayed\_rows](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Not_flushed_delayed_rows) | Integer | Global |
| [Ongoing\_anonymous\_gtid\_violating\_transaction\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ongoing_anonymous_gtid_violating_transaction_count) | Integer | Global |
| [Ongoing\_anonymous\_transaction\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ongoing_anonymous_transaction_count) | Integer | Global |
| [Ongoing\_automatic\_gtid\_violating\_transaction\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ongoing_automatic_gtid_violating_transaction_count) | Integer | Global |
| [Open\_files](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_files) | Integer | Global |
| [Open\_streams](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_streams) | Integer | Global |
| [Open\_table\_definitions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_table_definitions) | Integer | Global |
| [Open\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Open_tables) | Integer | Both |
| [Opened\_files](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_files) | Integer | Global |
| [Opened\_table\_definitions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_table_definitions) | Integer | Both |
| [Opened\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_tables) | Integer | Both |
| [Performance\_schema\_accounts\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_accounts_lost) | Integer | Global |
| [Performance\_schema\_cond\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_cond_classes_lost) | Integer | Global |
| [Performance\_schema\_cond\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_cond_instances_lost) | Integer | Global |
| [Performance\_schema\_digest\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_digest_lost) | Integer | Global |
| [Performance\_schema\_file\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_file_classes_lost) | Integer | Global |
| [Performance\_schema\_file\_handles\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_file_handles_lost) | Integer | Global |
| [Performance\_schema\_file\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_file_instances_lost) | Integer | Global |
| [Performance\_schema\_hosts\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_hosts_lost) | Integer | Global |
| [Performance\_schema\_index\_stat\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_index_stat_lost) | Integer | Global |
| [Performance\_schema\_locker\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_locker_lost) | Integer | Global |
| [Performance\_schema\_memory\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_memory_classes_lost) | Integer | Global |
| [Performance\_schema\_metadata\_lock\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_metadata_lock_lost) | Integer | Global |
| [Performance\_schema\_mutex\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_mutex_classes_lost) | Integer | Global |
| [Performance\_schema\_mutex\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_mutex_instances_lost) | Integer | Global |
| [Performance\_schema\_nested\_statement\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_nested_statement_lost) | Integer | Global |
| [Performance\_schema\_prepared\_statements\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_prepared_statements_lost) | Integer | Global |
| [Performance\_schema\_program\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_program_lost) | Integer | Global |
| [Performance\_schema\_rwlock\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_rwlock_classes_lost) | Integer | Global |
| [Performance\_schema\_rwlock\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_rwlock_instances_lost) | Integer | Global |
| [Performance\_schema\_session\_connect\_attrs\_longest\_seen](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_session_connect_attrs_longest_seen) | Integer | Global |
| [Performance\_schema\_session\_connect\_attrs\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_session_connect_attrs_lost) | Integer | Global |
| [Performance\_schema\_socket\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_socket_classes_lost) | Integer | Global |
| [Performance\_schema\_socket\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_socket_instances_lost) | Integer | Global |
| [Performance\_schema\_stage\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_stage_classes_lost) | Integer | Global |
| [Performance\_schema\_statement\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_statement_classes_lost) | Integer | Global |
| [Performance\_schema\_table\_handles\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_table_handles_lost) | Integer | Global |
| [Performance\_schema\_table\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_table_instances_lost) | Integer | Global |
| [Performance\_schema\_table\_lock\_stat\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_table_lock_stat_lost) | Integer | Global |
| [Performance\_schema\_thread\_classes\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_thread_classes_lost) | Integer | Global |
| [Performance\_schema\_thread\_instances\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_thread_instances_lost) | Integer | Global |
| [Performance\_schema\_users\_lost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#statvar_Performance_schema_users_lost) | Integer | Global |
| [Prepared\_stmt\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Prepared_stmt_count) | Integer | Global |
| [Queries](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Queries) | Integer | Both |
| [Questions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Questions) | Integer | Both |
| [Rewriter\_number\_loaded\_rules](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_number_loaded_rules) | Integer | Global |
| [Rewriter\_number\_reloads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_number_reloads) | Integer | Global |
| [Rewriter\_number\_rewritten\_queries](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_number_rewritten_queries) | Integer | Global |
| [Rewriter\_reload\_error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_reload_error) | Boolean | Global |
| [Rpl\_semi\_sync\_master\_clients](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_clients) | Integer | Global |
| [Rpl\_semi\_sync\_master\_net\_avg\_wait\_time](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_net_avg_wait_time) | Integer | Global |
| [Rpl\_semi\_sync\_master\_net\_wait\_time](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_net_wait_time) | Integer | Global |
| [Rpl\_semi\_sync\_master\_net\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_net_waits) | Integer | Global |
| [Rpl\_semi\_sync\_master\_no\_times](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_no_times) | Integer | Global |
| [Rpl\_semi\_sync\_master\_no\_tx](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_no_tx) | Integer | Global |
| [Rpl\_semi\_sync\_master\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_status) | Boolean | Global |
| [Rpl\_semi\_sync\_master\_timefunc\_failures](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_timefunc_failures) | Integer | Global |
| [Rpl\_semi\_sync\_master\_tx\_avg\_wait\_time](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_tx_avg_wait_time) | Integer | Global |
| [Rpl\_semi\_sync\_master\_tx\_wait\_time](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_tx_wait_time) | Integer | Global |
| [Rpl\_semi\_sync\_master\_tx\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_tx_waits) | Integer | Global |
| [Rpl\_semi\_sync\_master\_wait\_pos\_backtraverse](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_wait_pos_backtraverse) | Integer | Global |
| [Rpl\_semi\_sync\_master\_wait\_sessions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_wait_sessions) | Integer | Global |
| [Rpl\_semi\_sync\_master\_yes\_tx](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_master_yes_tx) | Integer | Global |
| [Rpl\_semi\_sync\_slave\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rpl_semi_sync_slave_status) | Boolean | Global |
| [Rsa\_public\_key](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rsa_public_key) | String | Global |
| [Secondary\_engine\_execution\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Secondary_engine_execution_count) | Integer | Both |
| [Select\_full\_join](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_full_join) | Integer | Both |
| [Select\_full\_range\_join](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_full_range_join) | Integer | Both |
| [Select\_range](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_range) | Integer | Both |
| [Select\_range\_check](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_range_check) | Integer | Both |
| [Select\_scan](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Select_scan) | Integer | Both |
| [Slave\_open\_temp\_tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slave_open_temp_tables) | Integer | Global |
| [Slave\_rows\_last\_search\_algorithm\_used](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slave_rows_last_search_algorithm_used) | String | Global |
| [Slow\_launch\_threads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slow_launch_threads) | Integer | Both |
| [Slow\_queries](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slow_queries) | Integer | Both |
| [Sort\_merge\_passes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_merge_passes) | Integer | Both |
| [Sort\_range](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_range) | Integer | Both |
| [Sort\_rows](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_rows) | Integer | Both |
| [Sort\_scan](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_scan) | Integer | Both |
| [Ssl\_accept\_renegotiates](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_accept_renegotiates) | Integer | Global |
| [Ssl\_accepts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_accepts) | Integer | Global |
| [Ssl\_callback\_cache\_hits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_callback_cache_hits) | Integer | Global |
| [Ssl\_cipher](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_cipher) | String | Both |
| [Ssl\_cipher\_list](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_cipher_list) | String | Both |
| [Ssl\_client\_connects](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_client_connects) | Integer | Global |
| [Ssl\_connect\_renegotiates](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_connect_renegotiates) | Integer | Global |
| [Ssl\_ctx\_verify\_depth](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_ctx_verify_depth) | Integer | Global |
| [Ssl\_ctx\_verify\_mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_ctx_verify_mode) | Integer | Global |
| [Ssl\_default\_timeout](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_default_timeout) | Integer | Both |
| [Ssl\_finished\_accepts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_finished_accepts) | Integer | Global |
| [Ssl\_finished\_connects](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_finished_connects) | Integer | Global |
| [Ssl\_server\_not\_after](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_server_not_after) | Integer | Both |
| [Ssl\_server\_not\_before](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_server_not_before) | Integer | Both |
| [Ssl\_session\_cache\_hits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_hits) | Integer | Global |
| [Ssl\_session\_cache\_misses](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_misses) | Integer | Global |
| [Ssl\_session\_cache\_mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_mode) | String | Global |
| [Ssl\_session\_cache\_overflows](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_overflows) | Integer | Global |
| [Ssl\_session\_cache\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_size) | Integer | Global |
| [Ssl\_session\_cache\_timeouts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_session_cache_timeouts) | Integer | Global |
| [Ssl\_sessions\_reused](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_sessions_reused) | Integer | Both |
| [Ssl\_used\_session\_cache\_entries](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_used_session_cache_entries) | Integer | Global |
| [Ssl\_verify\_depth](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_verify_depth) | Integer | Both |
| [Ssl\_verify\_mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_verify_mode) | Integer | Both |
| [Ssl\_version](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Ssl_version) | String | Both |
| [Table\_locks\_immediate](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_locks_immediate) | Integer | Global |
| [Table\_locks\_waited](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_locks_waited) | Integer | Global |
| [Table\_open\_cache\_hits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_open_cache_hits) | Integer | Both |
| [Table\_open\_cache\_misses](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_open_cache_misses) | Integer | Both |
| [Table\_open\_cache\_overflows](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Table_open_cache_overflows) | Integer | Both |
| [Tc\_log\_max\_pages\_used](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_max_pages_used) | Integer | Global |
| [Tc\_log\_page\_size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_page_size) | Integer | Global |
| [Tc\_log\_page\_waits](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_page_waits) | Integer | Global |
| [Threads\_cached](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_cached) | Integer | Global |
| [Threads\_connected](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_connected) | Integer | Global |
| [Threads\_created](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_created) | Integer | Global |
| [Threads\_running](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_running) | Integer | Global |
| [Uptime](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Uptime) | Integer | Global |
| [Uptime\_since\_flush\_status](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Uptime_since_flush_status) | Integer | Global |
| [validate\_password\_dictionary\_file\_last\_parsed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password_dictionary_file_last_parsed) | Datetime | Global |
| [validate\_password\_dictionary\_file\_words\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password_dictionary_file_words_count) | Integer | Global |
| [validate\_password.dictionary\_file\_last\_parsed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password.dictionary_file_last_parsed) | Datetime | Global |
| [validate\_password.dictionary\_file\_words\_count](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#statvar_validate_password.dictionary_file_words_count) | Integer | Global |

### 5.1.7 服务端命令参考项

When you start the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server, you can specify program options using any of the methods described in [Section 4.2.2, “Specifying Program Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#program-options). The most common methods are to provide options in an option file or on the command line. However, in most cases it is desirable to make sure that the server uses the same options each time it runs. The best way to ensure this is to list them in an option file. See [Section 4.2.2.2, “Using Option Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-files). That section also describes option file format and syntax.

[**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) reads options from the **[mysqld]** and **[server]** groups. [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) reads options from the **[mysqld]**, **[server]**, **[mysqld\_safe]**, and **[safe\_mysqld]** groups. [**mysql.server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-server) reads options from the **[mysqld]** and **[mysql.server]** groups.

[**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) accepts many command options. For a brief summary, execute this command:

mysqld --help

To see the full list, use this command:

mysqld --verbose --help

Some of the items in the list are actually system variables that can be set at server startup. These can be displayed at runtime using the [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables) statement. Some items displayed by the preceding [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) command do not appear in [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables) output; this is because they are options only and not system variables.

The following list shows some of the most common server options. Additional options are described in other sections:

* Options that affect security: See [Section 6.1.4, “Security-Related mysqld Options and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#security-options).
* SSL-related options: See [Command Options for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#encrypted-connection-options).
* Binary log control options: See [Section 5.4.4, “The Binary Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log).
* Replication-related options: See [Section 17.1.6, “Replication and Binary Logging Options and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-options).
* Options for loading plugins such as pluggable storage engines: See [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).
* Options specific to particular storage engines: See [Section 15.14, “InnoDB Startup Options and System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-parameters) and [Section 16.2.1, “MyISAM Startup Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-start).

Some options control the size of buffers or caches. For a given buffer, the server might need to allocate internal data structures. These structures typically are allocated from the total memory allocated to the buffer, and the amount of space required might be platform dependent. This means that when you assign a value to an option that controls a buffer size, the amount of space actually available might differ from the value assigned. In some cases, the amount might be less than the value assigned. It is also possible that the server adjusts a value upward. For example, if you assign a value of 0 to an option for which the minimal value is 1024, the server sets the value to 1024.

Values for buffer sizes, lengths, and stack sizes are given in bytes unless otherwise specified.

Some options take file name values. Unless otherwise specified, the default file location is the data directory if the value is a relative path name. To specify the location explicitly, use an absolute path name. Suppose that the data directory is /var/mysql/data. If a file-valued option is given as a relative path name, it is located under /var/mysql/data. If the value is an absolute path name, its location is as given by the path name.

You can also set the values of server system variables at server startup by using variable names as options. To assign a value to a server system variable, use an option of the form --***var\_name***=***value***. For example, [--sort\_buffer\_size=384M](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) sets the [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) variable to a value of 384MB.

When you assign a value to a variable, MySQL might automatically correct the value to stay within a given range, or adjust the value to the closest permissible value if only certain values are permitted.

To restrict the maximum value to which a system variable can be set at runtime with the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, specify this maximum by using an option of the form --maximum-***var\_name***=***value*** at server startup.

You can change the values of most system variables at runtime with the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement. See [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable).

[Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables), provides a full description for all variables, and additional information for setting them at server startup and runtime. For information on changing system variables, see [Section 5.1.1, “Configuring the Server”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-configuration).

* [--help](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_help), -?

|  |  |
| --- | --- |
| **Command-Line Format** | **--help** |

* Display a short help message and exit. Use both the [--verbose](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_verbose) and [--help](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_help) options to see the full message.

* [--admin-ssl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_admin-ssl), [--skip-admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl)

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl[={OFF|ON}]** |
| **Introduced** | 8.0.21 |
| **Deprecated** | 8.0.26 |
| **Type** | Boolean |
| **Default Value** | **ON** |

* The [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) option is like the [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) option, except that it applies to the administrative connection interface rather than the main connection interface. For information about these interfaces, see [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces).
* The [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) option specifies that the server permits but does not require encrypted connections on the administrative interface. This option is enabled by default.
* [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) can be specified in negated form as [--skip-admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) or a synonym ([--admin-ssl=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl), [--disable-admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl)). In this case, the option specifies that the server does not permit encrypted connections, regardless of the settings of the **admin\_tsl\_*xxx*** and **admin\_ssl\_*xxx*** system variables.
* The [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) option has an effect only at server startup on whether the administrative interface supports encrypted connections. It is ignored and has no effect on the operation of [**ALTER INSTANCE RELOAD TLS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-instance-reload-tls) at runtime. For example, you can use [--admin-ssl=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) to start the administrative interface with encrypted connections disabled, then reconfigure TLS and execute **ALTER INSTANCE RELOAD TLS FOR CHANNEL mysql\_admin** to enable encrypted connections at runtime.
* For general information about configuring connection-encryption support, see [Section 6.3.1, “Configuring MySQL to Use Encrypted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections). That discussion is written for the main connection interface, but the parameter names are similar for the administrative connection interface. Consider setting at least the [**admin\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cert) and [**admin\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_key) system variables on the server side and the [--ssl-ca](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-ca) (or [--ssl-capath](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-capath)) option on the client side. For additional information specifically about the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).
* Because support for encrypted connections is enabled by default, it is normally unnecessary to specify [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl). As of MySQL 8.0.26, [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) is deprecated and subject to removal in a future MySQL version. If it is desired to disable encrypted connections, that can be done without specifying [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) in negated form. Set the [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) system variable to the empty value to indicate that no TLS versions are supported. For example, these lines in the server my.cnf file disable encrypted connections:
* [mysqld]
* admin\_tls\_version=''

* [--allow-suspicious-udfs](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_allow-suspicious-udfs)

|  |  |
| --- | --- |
| **Command-Line Format** | **--allow-suspicious-udfs[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This option controls whether loadable functions that have only an **xxx** symbol for the main function can be loaded. By default, the option is off and only loadable functions that have at least one auxiliary symbol can be loaded; this prevents attempts at loading functions from shared object files other than those containing legitimate functions. See [Loadable Function Security Precautions](https://dev.mysql.com/doc/extending-mysql/8.0/en/adding-loadable-function.html#loadable-function-security).

* [--ansi](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_ansi)

|  |  |
| --- | --- |
| **Command-Line Format** | **--ansi** |

* Use standard (ANSI) SQL syntax instead of MySQL syntax. For more precise control over the server SQL mode, use the [--sql-mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) option instead. See [Section 1.7, “MySQL Standards Compliance”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#compatibility), and [Section 5.1.11, “Server SQL Modes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode).

* [--basedir=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_basedir)***[dir\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_basedir)***, [-b ***dir\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir)

|  |  |
| --- | --- |
| **Command-Line Format** | **--basedir=dir\_name** |
| **System Variable** | [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **parent of mysqld installation directory** |

* The path to the MySQL installation directory. This option sets the [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) system variable.
* The server executable determines its own full path name at startup and uses the parent of the directory in which it is located as the default [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) value. This in turn enables the server to use that [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) when searching for server-related information such as the share directory containing error messages.

* [--character-set-client-handshake](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_character-set-client-handshake)

|  |  |
| --- | --- |
| **Command-Line Format** | **--character-set-client-handshake[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Do not ignore character set information sent by the client. To ignore client information and use the default server character set, use [--skip-character-set-client-handshake](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_character-set-client-handshake); this makes MySQL behave like MySQL 4.0.

* [--chroot=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_chroot)***[dir\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_chroot)***, -r ***dir\_name***

|  |  |
| --- | --- |
| **Command-Line Format** | **--chroot=dir\_name** |
| **Type** | Directory name |

* Put the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server in a closed environment during startup by using the **chroot()** system call. This is a recommended security measure. Use of this option somewhat limits [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) and [**SELECT ... INTO OUTFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into).

* [--console](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_console)

|  |  |
| --- | --- |
| **Command-Line Format** | **--console** |
| **Platform Specific** | Windows |

* (Windows only.) Cause the default error log destination to be the console. This affects log sinks that base their own output destination on the default destination. See [Section 5.4.2, “The Error Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log). [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) does not close the console window if this option is used.
* [--console](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console) takes precedence over [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) if both are given.

* [--core-file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_core-file)

|  |  |
| --- | --- |
| **Command-Line Format** | **--core-file[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Write a core file if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) dies. The name and location of the core file is system dependent. On Linux, a core file named core.***pid*** is written to the current working directory of the process, which for [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) is the data directory. ***pid*** represents the process ID of the server process. On macOS, a core file named core.***pid*** is written to the /cores directory. On Solaris, use the **coreadm** command to specify where to write the core file and how to name it.
* For some systems, to get a core file you must also specify the [--core-file-size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqld_safe_core-file-size) option to [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe). See [Section 4.3.2, “mysqld\_safe — MySQL Server Startup Script”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe). On some systems, such as Solaris, you do not get a core file if you are also using the [--user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) option. There might be additional restrictions or limitations. For example, it might be necessary to execute **ulimit -c unlimited** before starting the server. Consult your system documentation.
* The [**innodb\_buffer\_pool\_in\_core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_in_core_file) variable can be used to reduce the size of core files on operating systems that support it. For more information, see [Section 15.8.3.7, “Excluding Buffer Pool Pages from Core Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-buffer-pool-in-core-file).

* [--daemonize](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_daemonize), -D

|  |  |
| --- | --- |
| **Command-Line Format** | **--daemonize[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This option causes the server to run as a traditional, forking daemon, permitting it to work with operating systems that use systemd for process control. For more information, see [Section 2.5.9, “Managing MySQL Server with systemd”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#using-systemd).
* [--daemonize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_daemonize) is mutually exclusive with [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize) and [--initialize-insecure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure).
* If the server is started using the --daemonize option and is not connected to a tty device, a default error logging option of --log-error="" is used in the absence of an explicit logging option, to direct error output to the default log file.
* -D is a synonym for [--daemonize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_daemonize).

* [--datadir=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_datadir)***[dir\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_datadir)***, -h ***dir\_name***

|  |  |
| --- | --- |
| **Command-Line Format** | **--datadir=dir\_name** |
| **System Variable** | [**datadir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The path to the MySQL server data directory. This option sets the [**datadir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) system variable. See the description of that variable.

* [--debug[=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_debug)***[debug\_options](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_debug)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_debug), -# [***debug\_options***]

|  |  |
| --- | --- |
| **Command-Line Format** | **--debug[=debug\_options]** |
| **System Variable** | [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value (Unix)** | **d:t:i:o,/tmp/mysqld.trace** |
| **Default Value (Windows)** | **d:t:i:O,\mysqld.trace** |

* If MySQL is configured with the [-DWITH\_DEBUG=1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_debug) **CMake** option, you can use this option to get a trace file of what [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) is doing. A typical ***debug\_options*** string is **d:t:o,*file\_name***. The default is **d:t:i:o,/tmp/mysqld.trace** on Unix and **d:t:i:O,\mysqld.trace** on Windows.
* Using [-DWITH\_DEBUG=1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_debug) to configure MySQL with debugging support enables you to use the [--debug="d,parser\_debug"](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) option when you start the server. This causes the Bison parser that is used to process SQL statements to dump a parser trace to the server's standard error output. Typically, this output is written to the error log.
* This option may be given multiple times. Values that begin with **+** or **-** are added to or subtracted from the previous value. For example, [--debug=T](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) [--debug=+P](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) sets the value to **P:T**.
* For more information, see [Section 5.9.4, “The DBUG Package”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dbug-package).

* [--debug-sync-timeout[=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_debug-sync-timeout)***[N](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_debug-sync-timeout)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_debug-sync-timeout)

|  |  |
| --- | --- |
| **Command-Line Format** | **--debug-sync-timeout[=#]** |
| **Type** | Integer |

* Controls whether the Debug Sync facility for testing and debugging is enabled. Use of Debug Sync requires that MySQL be configured with the [-DENABLE\_DEBUG\_SYNC=1](https://dev.mysql.com/doc/refman/5.6/en/source-configuration-options.html#option_cmake_enable_debug_sync) **CMake** option (see [Section 2.9.7, “MySQL Source-Configuration Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#source-configuration-options)). If Debug Sync is not compiled in, this option is not available. The option value is a timeout in seconds. The default value is 0, which disables Debug Sync. To enable it, specify a value greater than 0; this value also becomes the default timeout for individual synchronization points. If the option is given without a value, the timeout is set to 300 seconds.
* For a description of the Debug Sync facility and how to use synchronization points, see [MySQL Internals: Test Synchronization](https://dev.mysql.com/doc/internals/en/test-synchronization.html).

* [--default-time-zone=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_default-time-zone)***[timezone](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_default-time-zone)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-time-zone=name** |
| **Type** | String |

* Set the default server time zone. This option sets the global [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) system variable. If this option is not given, the default time zone is the same as the system time zone (given by the value of the [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone) system variable.

* [--defaults-extra-file=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_defaults-extra-file)***[file\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_defaults-extra-file)***

Read this option file after the global option file but (on Unix) before the user option file. If the file does not exist or is otherwise inaccessible, an error occurs. If ***file\_name*** is not an absolute path name, it is interpreted relative to the current directory. This must be the first option on the command line if it is used.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-file-options).

* [--defaults-file=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_defaults-file)***[file\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_defaults-file)***

Read only the given option file. If the file does not exist or is otherwise inaccessible, an error occurs. If ***file\_name*** is not an absolute path name, it is interpreted relative to the current directory.

Exception: Even with [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-file), [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) reads mysqld-auto.cnf.

**Note**

This must be the first option on the command line if it is used, except that if the server is started with the [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-file) and [--install](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install) (or [--install-manual](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install-manual)) options, [--install](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install) (or [--install-manual](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install-manual)) must be first.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-file-options).

* [--defaults-group-suffix=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_defaults-group-suffix)***[str](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_defaults-group-suffix)***

Read not only the usual option groups, but also groups with the usual names and a suffix of ***str***. For example, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) normally reads the **[mysqld]** group. If this option is given as [--defaults-group-suffix=\_other](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-group-suffix), [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) also reads the **[mysqld\_other]** group.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-file-options).

* [--early-plugin-load=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_early-plugin-load)***[plugin\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_early-plugin-load)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--early-plugin-load=plugin\_list** |
| **Type** | String |
| **Default Value** | **empty string** |

* This option tells the server which plugins to load before loading mandatory built-in plugins and before storage engine initialization. If multiple [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) options are given, only the last one applies.
* The option value is a semicolon-separated list of ***plugin\_library*** and ***name*=*plugin\_library*** values. Each ***plugin\_library*** is the name of a library file that contains plugin code, and each ***name*** is the name of a plugin to load. If a plugin library is named without any preceding plugin name, the server loads all plugins in the library. With a preceding plugin name, the server loads only the named plugin from the libary. The server looks for plugin library files in the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable.
* For example, if plugins named **myplug1** and **myplug2** are contained in the plugin library files myplug1.so and myplug2.so, use this option to perform an early plugin load:
* mysqld --early-plugin-load="myplug1=myplug1.so;myplug2=myplug2.so"
* Quotes surround the argument value because otherwise some command interpreters interpret semicolon (**;**) as a special character. (For example, Unix shells treat it as a command terminator.)
* Each named plugin is loaded early for a single invocation of [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) only. After a restart, the plugin is not loaded early unless [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) is used again.
* If the server is started using [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize) or [--initialize-insecure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure), plugins specified by [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) are not loaded.
* If the server is run with [--help](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_help), plugins specified by [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) are loaded but not initialized. This behavior ensures that plugin options are displayed in the help message.
* **InnoDB** tablespace encryption relies on the MySQL Keyring for encryption key management, and the keyring plugin to be used must be loaded prior to storage engine initialization to facilitate **InnoDB** recovery for encrypted tables. For example, administrators who want the **keyring\_file** plugin loaded at startup should use [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) with the appropriate option value (such as **keyring\_file.so** on Unix and Unix-like systems or **keyring\_file.dll** on Windows).
* For information about **InnoDB** tablespace encryption, see [Section 15.13, “InnoDB Data-at-Rest Encryption”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-data-encryption). For general information about plugin loading, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).
* **Note**
* For MySQL Keyring, this option is used only when the keystore is managed with a keyring plugin. If keystore management uses a keyring component rather than a plugin, specify component loading using a manifest file; see [Section 6.4.4.2, “Keyring Component Installation”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#keyring-component-installation).

* [--exit-info[=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_exit-info)***[flags](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_exit-info)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_exit-info), -T [***flags***]

|  |  |
| --- | --- |
| **Command-Line Format** | **--exit-info[=flags]** |
| **Type** | Integer |

* This is a bitmask of different flags that you can use for debugging the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server. Do not use this option unless you know exactly what it does!

* [--external-locking](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_external-locking)

|  |  |
| --- | --- |
| **Command-Line Format** | **--external-locking[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Enable external locking (system locking), which is disabled by default. If you use this option on a system on which **lockd** does not fully work (such as Linux), it is easy for [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to deadlock.
* To disable external locking explicitly, use --skip-external-locking.
* External locking affects only [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) table access. For more information, including conditions under which it can and cannot be used, see [Section 8.11.5, “External Locking”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#external-locking).

* [--flush](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_flush)

|  |  |
| --- | --- |
| **Command-Line Format** | **--flush[={OFF|ON}]** |
| **System Variable** | [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Flush (synchronize) all changes to disk after each SQL statement. Normally, MySQL does a write of all changes to disk only after each SQL statement and lets the operating system handle the synchronizing to disk. See [Section B.3.3.3, “What to Do If MySQL Keeps Crashing”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#crashing).
* **Note**
* If [--flush](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_flush) is specified, the value of [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) does not matter and changes to [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) have no effect on flush behavior.

* [--gdb](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_gdb)

|  |  |
| --- | --- |
| **Command-Line Format** | **--gdb[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Install an interrupt handler for **SIGINT** (needed to stop [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with **^C** to set breakpoints) and disable stack tracing and core file handling. See [Section 5.9.1.4, “Debugging mysqld under gdb”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#using-gdb-on-mysqld).
* On Windows, this option also suppresses the forking that is used to implement the [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) statement: Forking enables one process to act as a monitor to the other, which acts as the server. However, forking makes determining the server process to attach to for debugging more difficult, so starting the server with [--gdb](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_gdb) suppresses forking. For a server started with this option, [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) simply exits and does not restart.
* In non-debug settings, [--no-monitor](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-monitor) may be used to suppress forking the monitor process.

* [--initialize](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_initialize), -I

|  |  |
| --- | --- |
| **Command-Line Format** | **--initialize[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This option is used to initialize a MySQL installation by creating the data directory and populating the tables in the **mysql** system schema. For more information, see [Section 2.10.1, “Initializing the Data Directory”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#data-directory-initialization).
* When the server is started with [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize), some functionality is unavailable that limits the statements permitted in any file named by the [**init\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_file) system variable. For more information, see the description of that variable. In addition, the [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) system variable has no effect.
* The [--ndbcluster](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#option_mysqld_ndbcluster) option is ignored when used together with --initialize.
* [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize) is mutually exclusive with [--daemonize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_daemonize).
* -I is a synonym for [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize).

* [--initialize-insecure](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_initialize-insecure)

|  |  |
| --- | --- |
| **Command-Line Format** | **--initialize-insecure[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This option is used to initialize a MySQL installation by creating the data directory and populating the tables in the **mysql** system schema. This option implies [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize). For more information, see the description of that option, and [Section 2.10.1, “Initializing the Data Directory”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#data-directory-initialization).
* [--initialize-insecure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure) is mutually exclusive with [--daemonize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_daemonize).
* --innodb-***xxx***

Set an option for the **InnoDB** storage engine. The **InnoDB** options are listed in [Section 15.14, “InnoDB Startup Options and System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-parameters).

* [--install [](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_install)***[service\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_install)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_install)

|  |  |
| --- | --- |
| **Command-Line Format** | **--install [service\_name]** |
| **Platform Specific** | Windows |

* (Windows only) Install the server as a Windows service that starts automatically during Windows startup. The default service name is **MySQL** if no ***service\_name*** value is given. For more information, see [Section 2.3.4.8, “Starting MySQL as a Windows Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-service).
* **Note**
* If the server is started with the [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-file) and [--install](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install) options, [--install](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install) must be first.

* [--install-manual [](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_install-manual)***[service\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_install-manual)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_install-manual)

|  |  |
| --- | --- |
| **Command-Line Format** | **--install-manual [service\_name]** |
| **Platform Specific** | Windows |

* (Windows only) Install the server as a Windows service that must be started manually. It does not start automatically during Windows startup. The default service name is **MySQL** if no ***service\_name*** value is given. For more information, see [Section 2.3.4.8, “Starting MySQL as a Windows Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-service).
* **Note**
* If the server is started with the [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) and [--install-manual](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install-manual) options, [--install-manual](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_install-manual) must be first.

* [--language=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_language)***[lang\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_language)***[, -L](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_language)***[lang\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_language)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--language=name** |
| **Deprecated** | Yes; use [**lc-messages-dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages-dir) instead |
| **System Variable** | **language** |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **/usr/local/mysql/share/mysql/english/** |

* The language to use for error messages. ***lang\_name*** can be given as the language name or as the full path name to the directory where the language files are installed. See [Section 10.12, “Setting the Error Message Language”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#error-message-language).
* [--lc-messages-dir](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages-dir) and [--lc-messages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages) should be used rather than [--language](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_language), which is deprecated (and handled as a synonym for [--lc-messages-dir](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages-dir)). You should expect the [--language](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_language) option to be removed in a future MySQL release.

* [--large-pages](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_large-pages)

|  |  |
| --- | --- |
| **Command-Line Format** | **--large-pages[={OFF|ON}]** |
| **System Variable** | [**large\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_pages) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Platform Specific** | Linux |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Some hardware/operating system architectures support memory pages greater than the default (usually 4KB). The actual implementation of this support depends on the underlying hardware and operating system. Applications that perform a lot of memory accesses may obtain performance improvements by using large pages due to reduced Translation Lookaside Buffer (TLB) misses.
* MySQL supports the Linux implementation of large page support (which is called HugeTLB in Linux). See [Section 8.12.3.2, “Enabling Large Page Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#large-page-support). For Solaris support of large pages, see the description of the [--super-large-pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_super-large-pages) option.
* [--large-pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_large-pages) is disabled by default.

* [--lc-messages=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_lc-messages)***[locale\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_lc-messages)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--lc-messages=name** |
| **System Variable** | [**lc\_messages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **en\_US** |

* The locale to use for error messages. The default is **en\_US**. The server converts the argument to a language name and combines it with the value of [--lc-messages-dir](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages-dir) to produce the location for the error message file. See [Section 10.12, “Setting the Error Message Language”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#error-message-language).

* [--lc-messages-dir=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_lc-messages-dir)***[dir\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_lc-messages-dir)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--lc-messages-dir=dir\_name** |
| **System Variable** | [**lc\_messages\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages_dir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The directory where error messages are located. The server uses the value together with the value of [--lc-messages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_lc-messages) to produce the location for the error message file. See [Section 10.12, “Setting the Error Message Language”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#error-message-language).

* [--local-service](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_local-service)

|  |  |
| --- | --- |
| **Command-Line Format** | **--local-service** |

* (Windows only) A --local-service option following the service name causes the server to run using the **LocalService** Windows account that has limited system privileges. If both [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) and --local-service are given following the service name, they can be in any order. See [Section 2.3.4.8, “Starting MySQL as a Windows Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-service).

* [--log-error[=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-error)***[file\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-error)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-error)

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-error[=file\_name]** |
| **System Variable** | [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |

* Set the default error log destination to the named file. This affects log sinks that base their own output destination on the default destination. See [Section 5.4.2, “The Error Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log).
* If the option names no file, the default error log destination on Unix and Unix-like systems is a file named ***host\_name***.err in the data directory. The default destination on Windows is the same, unless the [--pid-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file) option is specified. In that case, the file name is the PID file base name with a suffix of .err in the data directory.
* If the option names a file, the default destination is that file (with an .err suffix added if the name has no suffix), located under the data directory unless an absolute path name is given to specify a different location.
* If error log output cannot be redirected to the error log file, an error occurs and startup fails.
* On Windows, [--console](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console) takes precedence over [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) if both are given. In this case, the default error log destination is the console rather than a file.

* [--log-isam[=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-isam)***[file\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-isam)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-isam)

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-isam[=file\_name]** |
| **Type** | File name |

* Log all **MyISAM** changes to this file (used only when debugging **MyISAM**).

* [--log-raw](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-raw)

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-raw[={OFF|ON}]** |
| **System Variable (≥ 8.0.19)** | [**log\_raw**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_raw) |
| **Scope (≥ 8.0.19)** | Global |
| **Dynamic (≥ 8.0.19)** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies (≥ 8.0.19)** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Passwords in certain statements written to the general query log, slow query log, and binary log are rewritten by the server not to occur literally in plain text. Password rewriting can be suppressed for the general query log by starting the server with the [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) option. This option may be useful for diagnostic purposes, to see the exact text of statements as received by the server, but for security reasons is not recommended for production use.
* If a query rewrite plugin is installed, the [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) option affects statement logging as follows:
  + Without [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw), the server logs the statement returned by the query rewrite plugin. This may differ from the statement as received.
  + With [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw), the server logs the original statement as received.

For more information, see [Section 6.1.2.3, “Passwords and Logging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-logging).

* [--log-short-format](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-short-format)

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-short-format[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Log less information to the slow query log, if it has been activated.

* [--log-tc=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-tc)***[file\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-tc)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-tc=file\_name** |
| **Type** | File name |
| **Default Value** | **tc.log** |

* The name of the memory-mapped transaction coordinator log file (for XA transactions that affect multiple storage engines when the binary log is disabled). The default name is tc.log. The file is created under the data directory if not given as a full path name. This option is unused.

* [--log-tc-size=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-tc-size)***[size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_log-tc-size)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-tc-size=#** |
| **Type** | Integer |
| **Default Value** | **6 \* page size** |
| **Minimum Value** | **6 \* page size** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* The size in bytes of the memory-mapped transaction coordinator log. The default and minimum values are 6 times the page size, and the value must be a multiple of the page size.

* [--memlock](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_memlock)

|  |  |
| --- | --- |
| **Command-Line Format** | **--memlock[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Lock the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) process in memory. This option might help if you have a problem where the operating system is causing [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to swap to disk.
* [--memlock](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_memlock) works on systems that support the **mlockall()** system call; this includes Solaris, most Linux distributions that use a 2.4 or higher kernel, and perhaps other Unix systems. On Linux systems, you can tell whether or not **mlockall()** (and thus this option) is supported by checking to see whether or not it is defined in the system mman.h file, like this:
* shell> **grep mlockall /usr/include/sys/mman.h**
* If **mlockall()** is supported, you should see in the output of the previous command something like the following:
* extern int mlockall (int \_\_flags) \_\_THROW;
* **Important**
* Use of this option may require you to run the server as **root**, which, for reasons of security, is normally not a good idea. See [Section 6.1.5, “How to Run MySQL as a Normal User”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#changing-mysql-user).
* On Linux and perhaps other systems, you can avoid the need to run the server as **root** by changing the limits.conf file. See the notes regarding the memlock limit in [Section 8.12.3.2, “Enabling Large Page Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#large-page-support).
* You must not use this option on a system that does not support the **mlockall()** system call; if you do so, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) is very likely to exit as soon as you try to start it.

* [--myisam-block-size=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_myisam-block-size)***[N](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_myisam-block-size)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-block-size=#** |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **16384** |

* The block size to be used for **MyISAM** index pages.

* [--no-defaults](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_no-defaults)

Do not read any option files. If program startup fails due to reading unknown options from an option file, [--no-defaults](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-defaults) can be used to prevent them from being read. This must be the first option on the command line if it is used.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-file-options).

* [--no-dd-upgrade](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_no-dd-upgrade)

|  |  |
| --- | --- |
| **Command-Line Format** | **--no-dd-upgrade[={OFF|ON}]** |
| **Deprecated** | 8.0.16 |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* **Note**
* This option is deprecated as of MySQL 8.0.16. It is superseded by the [--upgrade](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_upgrade) option, which provides finer control over data dictionary and server upgrade behavior.
* Prevent automatic upgrade of the data dictionary tables during the MySQL server startup process. This option is typically used when starting the MySQL server following an in-place upgrade of an existing installation to a newer MySQL version, which may include changes to data dictionary table definitions.
* When [--no-dd-upgrade](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-dd-upgrade) is specified, and the server finds that its expected version of the data dictionary differs from the version stored in the data dictionary itself, startup fails with an error stating that data dictionary upgrade is prohibited;
* [ERROR] [MY-011091] [Server] Data dictionary upgrade prohibited by the
* command line option '--no\_dd\_upgrade'.
* [ERROR] [MY-010020] [Server] Data Dictionary initialization failed.
* During a normal startup, the data dictionary version of the server is compared to the version stored in the data dictionary to determine whether data dictionary table definitions should be upgraded. If an upgrade is necessary and supported, the server creates data dictionary tables with updated definitions, copies persisted metadata to the new tables, atomically replaces the old tables with the new ones, and reinitializes the data dictionary. If an upgrade is not necessary, startup continues without updating data dictionary tables.

* [--no-monitor](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_no-monitor)

|  |  |
| --- | --- |
| **Command-Line Format** | **--no-monitor[={OFF|ON}]** |
| **Introduced** | 8.0.12 |
| **Platform Specific** | Windows |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* (Windows only). This option suppresses the forking that is used to implement the [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) statement: Forking enables one process to act as a monitor to the other, which acts as the server. For a server started with this option, [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) simply exits and does not restart.
* [--no-monitor](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-monitor) is not available prior to MySQL 8.0.12. The [--gdb](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_gdb) option can be used as a workaround.

* [--old-style-user-limits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_old-style-user-limits)

|  |  |
| --- | --- |
| **Command-Line Format** | **--old-style-user-limits[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Enable old-style user limits. (Before MySQL 5.0.3, account resource limits were counted separately for each host from which a user connected rather than per account row in the **user** table.) See [Section 6.2.20, “Setting Account Resource Limits”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#user-resources).
* --performance-schema-xxx

Configure a Performance Schema option. For details, see [Section 27.14, “Performance Schema Command Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-options).

* [--plugin-load=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_plugin-load)***[plugin\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_plugin-load)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--plugin-load=plugin\_list** |
| **System Variable** | **plugin\_load** |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* This option tells the server to load the named plugins at startup. If multiple [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) options are given, only the last one applies. Additional plugins to load may be specified using [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) options.
* The option value is a semicolon-separated list of ***plugin\_library*** and ***name*=*plugin\_library*** values. Each ***plugin\_library*** is the name of a library file that contains plugin code, and each ***name*** is the name of a plugin to load. If a plugin library is named without any preceding plugin name, the server loads all plugins in the library. With a preceding plugin name, the server loads only the named plugin from the libary. The server looks for plugin library files in the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable.
* For example, if plugins named **myplug1** and **myplug2** are contained in the plugin library files myplug1.so and myplug2.so, use this option to perform an early plugin load:
* mysqld --plugin-load="myplug1=myplug1.so;myplug2=myplug2.so"
* Quotes surround the argument value because otherwise some command interpreters interpret semicolon (**;**) as a special character. (For example, Unix shells treat it as a command terminator.)
* Each named plugin is loaded for a single invocation of [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) only. After a restart, the plugin is not loaded unless [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) is used again. This is in contrast to [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin), which adds an entry to the **mysql.plugins** table to cause the plugin to be loaded for every normal server startup.
* During the normal startup sequence, the server determines which plugins to load by reading the **mysql.plugins** system table. If the server is started with the [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) option, plugins registered in the **mysql.plugins** table are not loaded and are unavailable. [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) enables plugins to be loaded even when [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) is given. [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) also enables plugins to be loaded at startup that cannot be loaded at runtime.
* For additional information about plugin loading, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).

* [--plugin-load-add=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_plugin-load-add)***[plugin\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_plugin-load-add)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--plugin-load-add=plugin\_list** |
| **System Variable** | **plugin\_load\_add** |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* This option complements the [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) option. [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) adds a plugin or plugins to the set of plugins to be loaded at startup. The argument format is the same as for [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load). [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) can be used to avoid specifying a large set of plugins as a single long unwieldy [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) argument.
* [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) can be given in the absence of [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), but any instance of [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) that appears before [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load). has no effect because [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) resets the set of plugins to load. In other words, these options:
* --plugin-load=x --plugin-load-add=y
* are equivalent to this option:
* --plugin-load="x;y"
* But these options:
* --plugin-load-add=y --plugin-load=x
* are equivalent to this option:
* --plugin-load=x
* For additional information about plugin loading, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).

* [--plugin-](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_plugin-xxx)***[xxx](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_plugin-xxx)***

Specifies an option that pertains to a server plugin. For example, many storage engines can be built as plugins, and for such engines, options for them can be specified with a --plugin prefix. Thus, the [--innodb-file-per-table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table) option for **InnoDB** can be specified as [--plugin-innodb-file-per-table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table).

For boolean options that can be enabled or disabled, the --skip prefix and other alternative formats are supported as well (see [Section 4.2.2.4, “Program Option Modifiers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-modifiers)). For example, [--skip-plugin-innodb-file-per-table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table) disables [innodb-file-per-table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table).

The rationale for the --plugin prefix is that it enables plugin options to be specified unambiguously if there is a name conflict with a built-in server option. For example, were a plugin writer to name a plugin “sql” and implement a “mode” option, the option name might be [--sql-mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode), which would conflict with the built-in option of the same name. In such cases, references to the conflicting name are resolved in favor of the built-in option. To avoid the ambiguity, users can specify the plugin option as --plugin-sql-mode. Use of the --plugin prefix for plugin options is recommended to avoid any question of ambiguity.

* [--port=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_port)***[port\_num](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_port)***, -P ***port\_num***

|  |  |
| --- | --- |
| **Command-Line Format** | **--port=port\_num** |
| **System Variable** | [**port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_port) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **3306** |
| **Minimum Value** | **0** |
| **Maximum Value** | **65535** |

* The port number to use when listening for TCP/IP connections. On Unix and Unix-like systems, the port number must be 1024 or higher unless the server is started by the **root** operating system user. Setting this option to 0 causes the default value to be used.

* [--port-open-timeout=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_port-open-timeout)***[num](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_port-open-timeout)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--port-open-timeout=#** |
| **Type** | Integer |
| **Default Value** | **0** |

* On some systems, when the server is stopped, the TCP/IP port might not become available immediately. If the server is restarted quickly afterward, its attempt to reopen the port can fail. This option indicates how many seconds the server should wait for the TCP/IP port to become free if it cannot be opened. The default is not to wait.

* [--print-defaults](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_print-defaults)

Print the program name and all options that it gets from option files. Password values are masked. This must be the first option on the command line if it is used, except that it may be used immediately after [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-file) or [--defaults-extra-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_defaults-extra-file).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-file-options).

* [--remove [](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_remove)***[service\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_remove)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_remove)

|  |  |
| --- | --- |
| **Command-Line Format** | **--remove [service\_name]** |
| **Platform Specific** | Windows |

* (Windows only) Remove a MySQL Windows service. The default service name is **MySQL** if no ***service\_name*** value is given. For more information, see [Section 2.3.4.8, “Starting MySQL as a Windows Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-service).

* [--safe-user-create](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_safe-user-create)

|  |  |
| --- | --- |
| **Command-Line Format** | **--safe-user-create[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If this option is enabled, a user cannot create new MySQL users by using the [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant) statement unless the user has the [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_insert) privilege for the **mysql.user** system table or any column in the table. If you want a user to have the ability to create new users that have those privileges that the user has the right to grant, you should grant the user the following privilege:
* GRANT INSERT(user) ON mysql.user TO '***user\_name***'@'***host\_name***';
* This ensures that the user cannot change any privilege columns directly, but has to use the [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant) statement to give privileges to other users.

* [--skip-grant-tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_skip-grant-tables)

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-grant-tables[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This option affects the server startup sequence:
  + [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) causes the server not to read the grant tables in the **mysql** system schema, and thus to start without using the privilege system at all. This gives anyone with access to the server unrestricted access to all databases.

Because starting the server with [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) disables authentication checks, the server also disables remote connections in that case by enabling [**skip\_networking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_networking).

To cause a server started with [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) to load the grant tables at runtime, perform a privilege-flushing operation, which can be done in these ways:

* + - Issue a MySQL [**FLUSH PRIVILEGES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-privileges) statement after connecting to the server.
    - Execute a [**mysqladmin flush-privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) or [**mysqladmin reload**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) command from the command line.

Privilege flushing might also occur implicitly as a result of other actions performed after startup, thus causing the server to start using the grant tables. For example, the server flushes the privileges if it performs an upgrade during the startup sequence.

* + [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) disables failed-login tracking and temporary account locking because those capabilities depend on the grant tables. See [Section 6.2.15, “Password Management”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-management).
  + [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) causes the server not to load certain other objects registered in the data dictionary or the **mysql** system schema:
    - Scheduled events installed using [**CREATE EVENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-event) and registered in the **events** data dictionary table.
    - Plugins installed using [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) and registered in the **mysql.plugin** system table.

To cause plugins to be loaded even when using [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables), use the [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) or [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option.

* + - Loadable functions installed using [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable) and registered in the **mysql.func** system table.

[--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) does not suppress loading during startup of components.

* + [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) causes the [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) system variable to have no effect.

* [--skip-host-cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_skip-host-cache)

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-host-cache** |

* Disable use of the internal host cache for faster name-to-IP resolution. With the cache disabled, the server performs a DNS lookup every time a client connects.
* Use of [--skip-host-cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) is similar to setting the [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) system variable to 0, but [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) is more flexible because it can also be used to resize, enable, or disable the host cache at runtime, not just at server startup.
* Starting the server with [--skip-host-cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) does not prevent runtime changes to the value of [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size), but such changes have no effect and the cache is not re-enabled even if [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) is set larger than 0.
* For more information about how the host cache works, see [Section 5.1.12.3, “DNS Lookups and the Host Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache).

* [--skip-innodb](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\innodb-storage-engine.html" \l "option_mysqld_innodb)

Disable the **InnoDB** storage engine. In this case, because the default storage engine is [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html), the server does not start unless you also use [--default-storage-engine](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) and [--default-tmp-storage-engine](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) to set the default to some other engine for both permanent and **TEMPORARY** tables.

The **InnoDB** storage engine cannot be disabled, and the [--skip-innodb](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#option_mysqld_innodb) option is deprecated and has no effect. Its use results in a warning. Expect this option to be removed in a future MySQL release.

* [--skip-new](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_skip-new)

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-new** |

* This option disables (what used to be considered) new, possibly unsafe behaviors. It results in these settings: [**delay\_key\_write=OFF**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delay_key_write), [**concurrent\_insert=NEVER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_concurrent_insert), [**automatic\_sp\_privileges=OFF**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges). It also causes [**OPTIMIZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#optimize-table) to be mapped to [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) for storage engines for which [**OPTIMIZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#optimize-table) is not supported.

* [--skip-show-database](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_skip-show-database)

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-show-database** |
| **System Variable** | [**skip\_show\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_show_database) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This option sets the [**skip\_show\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_show_database) system variable that controls who is permitted to use the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-databases) statement. See [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

* [--skip-stack-trace](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_skip-stack-trace)

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-stack-trace** |

* Do not write stack traces. This option is useful when you are running [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) under a debugger. On some systems, you also must use this option to get a core file. See [Section 5.9, “Debugging MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#debugging-mysql).

* [--slow-start-timeout=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_slow-start-timeout)***[timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_slow-start-timeout)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--slow-start-timeout=#** |
| **Type** | Integer |
| **Default Value** | **15000** |

* This option controls the Windows service control manager's service start timeout. The value is the maximum number of milliseconds that the service control manager waits before trying to kill the windows service during startup. The default value is 15000 (15 seconds). If the MySQL service takes too long to start, you may need to increase this value. A value of 0 means there is no timeout.

* [--socket=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_socket)***[path](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_socket)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--socket={file\_name|pipe\_name}** |
| **System Variable** | [**socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_socket) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value (Windows)** | **MySQL** |
| **Default Value (Other)** | **/tmp/mysql.sock** |

* On Unix, this option specifies the Unix socket file to use when listening for local connections. The default value is /tmp/mysql.sock. If this option is given, the server creates the file in the data directory unless an absolute path name is given to specify a different directory. On Windows, the option specifies the pipe name to use when listening for local connections that use a named pipe. The default value is **MySQL** (not case-sensitive).

* [--sql-mode=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)***[value](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)***[[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)***[value](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)***[[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)***[value](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)***[...]]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sql-mode)

|  |  |
| --- | --- |
| **Command-Line Format** | **--sql-mode=name** |
| **System Variable** | [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Set |
| **Default Value** | **ONLY\_FULL\_GROUP\_BY STRICT\_TRANS\_TABLES NO\_ZERO\_IN\_DATE NO\_ZERO\_DATE ERROR\_FOR\_DIVISION\_BY\_ZERO NO\_ENGINE\_SUBSTITUTION** |
| **Valid Values** | **ALLOW\_INVALID\_DATES**  **ANSI\_QUOTES**  **ERROR\_FOR\_DIVISION\_BY\_ZERO**  **HIGH\_NOT\_PRECEDENCE**  **IGNORE\_SPACE**  **NO\_AUTO\_VALUE\_ON\_ZERO**  **NO\_BACKSLASH\_ESCAPES**  **NO\_DIR\_IN\_CREATE**  **NO\_ENGINE\_SUBSTITUTION**  **NO\_UNSIGNED\_SUBTRACTION**  **NO\_ZERO\_DATE**  **NO\_ZERO\_IN\_DATE**  **ONLY\_FULL\_GROUP\_BY**  **PAD\_CHAR\_TO\_FULL\_LENGTH**  **PIPES\_AS\_CONCAT**  **REAL\_AS\_FLOAT**  **STRICT\_ALL\_TABLES**  **STRICT\_TRANS\_TABLES**  **TIME\_TRUNCATE\_FRACTIONAL** |

* Set the SQL mode. See [Section 5.1.11, “Server SQL Modes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode).
* **Note**
* MySQL installation programs may configure the SQL mode during the installation process.
* If the SQL mode differs from the default or from what you expect, check for a setting in an option file that the server reads at startup.

* [--ssl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_ssl), [--skip-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl)

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl[={OFF|ON}]** |
| **Deprecated** | 8.0.26 |
| **Disabled by** | **skip-ssl** |
| **Type** | Boolean |
| **Default Value** | **ON** |

* The [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) option specifies that the server permits but does not require encrypted connections on the main connection interface. This option is enabled by default.
* A similar option, [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl), is like the [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl), except that it applies to the administrative connection interface rather than the main connection interface. For information about these interfaces, see [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces).
* [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) can be specified in negated form as [--skip-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) or a synonym ([--ssl=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl), [--disable-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl)). In this case, the option specifies that the server does not permit encrypted connections, regardless of the settings of the **tls\_*xxx*** and **ssl\_*xxx*** system variables.
* The [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) option has an effect only at server startup on whether the server supports encrypted connections. It is ignored and has no effect on the operation of [**ALTER INSTANCE RELOAD TLS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-instance-reload-tls) at runtime. For example, you can use [--ssl=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) to start the server with encrypted connections disabled, then reconfigure TLS and execute **ALTER INSTANCE RELOAD TLS** to enable encrypted connections at runtime.
* For more information about configuring whether the server permits clients to connect using SSL and indicating where to find SSL keys and certificates, see [Section 6.3.1, “Configuring MySQL to Use Encrypted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections), which also describes server capabilities for certificate and key file autogeneration and autodiscovery. Consider setting at least the [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) and [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key) system variables on the server side and the [--ssl-ca](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-ca) (or [--ssl-capath](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-capath)) option on the client side.
* Because support for encrypted connections is enabled by default, it is normally unnecessary to specify [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl). As of MySQL 8.0.26, [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) is deprecated and subject to removal in a future MySQL version. If it is desired to disable encrypted connections, that can be done without specifying [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) in negated form. Set the [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version) system variable to the empty value to indicate that no TLS versions are supported. For example, these lines in the server my.cnf file disable encrypted connections:
* [mysqld]
* tls\_version=''

* [--standalone](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_standalone)

|  |  |
| --- | --- |
| **Command-Line Format** | **--standalone** |
| **Platform Specific** | Windows |

* Available on Windows only; instructs the MySQL server not to run as a service.

* [--super-large-pages](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_super-large-pages)

|  |  |
| --- | --- |
| **Command-Line Format** | **--super-large-pages[={OFF|ON}]** |
| **Platform Specific** | Solaris |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Standard use of large pages in MySQL attempts to use the largest size supported, up to 4MB. Under Solaris, a “super large pages” feature enables uses of pages up to 256MB. This feature is available for recent SPARC platforms. It can be enabled or disabled by using the [--super-large-pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_super-large-pages) or [--skip-super-large-pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_super-large-pages) option.

* [--symbolic-links](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_symbolic-links), [--skip-symbolic-links](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_symbolic-links)

|  |  |
| --- | --- |
| **Command-Line Format** | **--symbolic-links[={OFF|ON}]** |
| **Deprecated** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Enable or disable symbolic link support. On Unix, enabling symbolic links means that you can link a **MyISAM** index file or data file to another directory with the **INDEX DIRECTORY** or **DATA DIRECTORY** option of the [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statement. If you delete or rename the table, the files that its symbolic links point to also are deleted or renamed. See [Section 8.12.2.2, “Using Symbolic Links for MyISAM Tables on Unix”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#symbolic-links-to-tables).
* **Note**
* Symbolic link support, along with the [--symbolic-links](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_symbolic-links) option that controls it, is deprecated; you should expect it to be removed in a future version of MySQL. In addition, the option is disabled by default. The related [**have\_symlink**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_symlink) system variable also is deprecated; expect it be removed in a future version of MySQL.
* This option has no meaning on Windows.

* [--sysdate-is-now](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_sysdate-is-now)

|  |  |
| --- | --- |
| **Command-Line Format** | **--sysdate-is-now[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* [**SYSDATE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_sysdate) by default returns the time at which it executes, not the time at which the statement in which it occurs begins executing. This differs from the behavior of [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now). This option causes [**SYSDATE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_sysdate) to be a synonym for [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now). For information about the implications for binary logging and replication, see the description for [**SYSDATE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_sysdate) in [Section 12.7, “Date and Time Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#date-and-time-functions) and for **SET TIMESTAMP** in [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

* [--tc-heuristic-recover={COMMIT|ROLLBACK}](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_tc-heuristic-recover)

|  |  |
| --- | --- |
| **Command-Line Format** | **--tc-heuristic-recover=name** |
| **Type** | Enumeration |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF**  **COMMIT**  **ROLLBACK** |

* The decision to use in a manual heuristic recovery.
* If a **--tc-heuristic-recover** option is specified, the server exits regardless of whether manual heuristic recovery is successful.
* On systems with more than one storage engine capable of two-phase commit, the **ROLLBACK** option is not safe and causes recovery to halt with the following error:
* [ERROR] --tc-heuristic-recover rollback
* strategy is not safe on systems with more than one 2-phase-commit-capable
* storage engine. Aborting crash recovery.

* [--transaction-isolation=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_transaction-isolation)***[level](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_transaction-isolation)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--transaction-isolation=name** |
| **System Variable** | [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **REPEATABLE-READ** |
| **Valid Values** | **READ-UNCOMMITTED**  **READ-COMMITTED**  **REPEATABLE-READ**  **SERIALIZABLE** |

* Sets the default transaction isolation level. The **level** value can be [**READ-UNCOMMITTED**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_read-uncommitted), [**READ-COMMITTED**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_read-committed), [**REPEATABLE-READ**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_repeatable-read), or [**SERIALIZABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_serializable). See [Section 13.3.7, “SET TRANSACTION Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction).
* The default transaction isolation level can also be set at runtime using the [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) statement or by setting the [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) system variable.

* [--transaction-read-only](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_transaction-read-only)

|  |  |
| --- | --- |
| **Command-Line Format** | **--transaction-read-only[={OFF|ON}]** |
| **System Variable** | [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Sets the default transaction access mode. By default, read-only mode is disabled, so the mode is read/write.
* To set the default transaction access mode at runtime, use the [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) statement or set the [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) system variable. See [Section 13.3.7, “SET TRANSACTION Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction).

* [--tmpdir=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_tmpdir)***[dir\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_tmpdir)***, -t ***dir\_name***

|  |  |
| --- | --- |
| **Command-Line Format** | **--tmpdir=dir\_name** |
| **System Variable** | [**tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmpdir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The path of the directory to use for creating temporary files. It might be useful if your default **/tmp** directory resides on a partition that is too small to hold temporary tables. This option accepts several paths that are used in round-robin fashion. Paths should be separated by colon characters (**:**) on Unix and semicolon characters (**;**) on Windows.
* [--tmpdir](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_tmpdir) can be a non-permanent location, such as a directory on a memory-based file system or a directory that is cleared when the server host restarts. If the MySQL server is acting as a replica, and you are using a non-permanent location for [--tmpdir](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_tmpdir), consider setting a different temporary directory for the replica using the [**slave\_load\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_load_tmpdir) system variable. For a replica, the temporary files used to replicate [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) statements are stored in this directory, so with a permanent location they can survive machine restarts, although replication can now continue after a restart if the temporary files have been removed.
* For more information about the storage location of temporary files, see [Section B.3.3.5, “Where MySQL Stores Temporary Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#temporary-files).

* [--upgrade=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_upgrade)***[value](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_upgrade)***

|  |  |
| --- | --- |
| **Command-Line Format** | **--upgrade=value** |
| **Introduced** | 8.0.16 |
| **Type** | Enumeration |
| **Default Value** | **AUTO** |
| **Valid Values** | **AUTO**  **NONE**  **MINIMAL**  **FORCE** |

* This option controls whether and how the server performs an automatic upgrade at startup. Automatic upgrade involves two steps:
  + Step 1: Data dictionary upgrade.

This step upgrades:

* + - The data dictionary tables in the **mysql** schema. If the actual data dictionary version is lower than the current expected version, the server upgrades the data dictionary. If it cannot, or is prevented from doing so, the server cannot run.
    - The Performance Schema and **INFORMATION\_SCHEMA**.
  + Step 2: Server upgrade.

This step comprises all other upgrade tasks. If the existing installation data has a lower MySQL version than the server expects, it must be upgraded:

* + - The system tables in the **mysql** schema (the remaining non-data dictionary tables).
    - The **sys** schema.
    - User schemas.

For details about upgrade steps 1 and 2, see [Section 2.11.3, “What the MySQL Upgrade Process Upgrades”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#upgrading-what-is-upgraded).

These [--upgrade](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_upgrade) option values are permitted:

* + **AUTO**

The server performs an automatic upgrade of anything it finds to be out of date (steps 1 and 2). This is the default action if [--upgrade](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_upgrade) is not specified explicitly.

* + **NONE**

The server performs no automatic upgrade steps during the startup process (skips steps 1 and 2). Because this option value prevents a data dictionary upgrade, the server exits with an error if the data dictionary is found to be out of date:

[ERROR] [MY-013381] [Server] Server shutting down because upgrade is

required, yet prohibited by the command line option '--upgrade=NONE'.

[ERROR] [MY-010334] [Server] Failed to initialize DD Storage Engine

[ERROR] [MY-010020] [Server] Data Dictionary initialization failed.

* + **MINIMAL**

The server upgrades the data dictionary, the Performance Schema, and the **INFORMATION\_SCHEMA**, if necessary (step 1). Note that following an upgrade with this option, Group Replication cannot be started, because system tables on which the replication internals depend are not updated, and reduced functionality might also be apparent in other areas.

* + **FORCE**

The server upgrades the data dictionary, the Performance Schema, and the **INFORMATION\_SCHEMA**, if necessary (step 1). In addition, the server forces an upgrade of everything else (step 2). Expect server startup to take longer with this option because the server checks all objects in all schemas.

**FORCE** is useful to force step 2 actions to be performed if the server thinks they are not necessary. For example, you may believe that a system table is missing or has become damaged and want to force a repair.

The following table summarizes the actions taken by the server for each option value.

| **Option Value** | **Server Performs Step 1?** | **Server Performs Step 2?** |
| --- | --- | --- |
| **AUTO** | If necessary | If necessary |
| **NONE** | No | No |
| **MINIMAL** | If necessary | No |
| **FORCE** | If necessary | Yes |

* [--user={](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_user)***[user\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_user)***[|](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_user)***[user\_id](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_user)***[}](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_user), -u {***user\_name***|***user\_id***}

|  |  |
| --- | --- |
| **Command-Line Format** | **--user=name** |
| **Type** | String |

* Run the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server as the user having the name ***user\_name*** or the numeric user ID ***user\_id***. (“User” in this context refers to a system login account, not a MySQL user listed in the grant tables.)
* This option is mandatory when starting [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) as **root**. The server changes its user ID during its startup sequence, causing it to run as that particular user rather than as **root**. See [Section 6.1.1, “Security Guidelines”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#security-guidelines).
* To avoid a possible security hole where a user adds a [--user=root](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) option to a my.cnf file (thus causing the server to run as **root**), [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) uses only the first [--user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) option specified and produces a warning if there are multiple [--user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) options. Options in /etc/my.cnf and $MYSQL\_HOME/my.cnf are processed before command-line options, so it is recommended that you put a [--user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) option in /etc/my.cnf and specify a value other than **root**. The option in /etc/my.cnf is found before any other [--user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) options, which ensures that the server runs as a user other than **root**, and that a warning results if any other [--user](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_user) option is found.

* [--validate-config](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_validate-config)

|  |  |
| --- | --- |
| **Command-Line Format** | **--validate-config[={OFF|ON}]** |
| **Introduced** | 8.0.16 |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Validate the server startup configuration. If no errors are found, the server terminates with an exit code of 0. If an error is found, the server displays a diagnostic message and terminates with an exit code of 1. Warning and information messages may also be displayed, depending on the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value, but do not produce immediate validation termination or an exit code of 1. For more information, see [Section 5.1.3, “Server Configuration Validation”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-configuration-validation).

* [--validate-user-plugins[={OFF|ON}]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_validate-user-plugins)

|  |  |
| --- | --- |
| **Command-Line Format** | **--validate-user-plugins[={OFF|ON}]** |
| **Type** | Boolean |
| **Default Value** | **ON** |

* If this option is enabled (the default), the server checks each user account and produces a warning if conditions are found that would make the account unusable:
  + The account requires an authentication plugin that is not loaded.
  + The account requires the **sha256\_password** or **caching\_sha2\_password** authentication plugin but the server was started with neither SSL nor RSA enabled as required by the plugin.

Enabling [--validate-user-plugins](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_validate-user-plugins) slows down server initialization and [**FLUSH PRIVILEGES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-privileges). If you do not require the additional checking, you can disable this option at startup to avoid the performance decrement.

* [--verbose](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_verbose), [-v](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_verbose)

Use this option with the [--help](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_help) option for detailed help.

* [--version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_version), -V

Display version information and exit.

### 5.1.8服务端系统变量

The MySQL server maintains many system variables that configure its operation. Each system variable has a default value. System variables can be set at server startup using options on the command line or in an option file. Most of them can be changed dynamically at runtime using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, which enables you to modify operation of the server without having to stop and restart it. You can also use system variable values in expressions.

Setting a global system variable runtime value normally requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege). Setting a session system runtime variable value normally requires no special privileges and can be done by any user, although there are exceptions. For more information, see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)

There are several ways to see the names and values of system variables:

* To see the values that a server uses based on its compiled-in defaults and any option files that it reads, use this command:
* mysqld --verbose --help
* To see the values that a server uses based only on its compiled-in defaults, ignoring the settings in any option files, use this command:
* mysqld --no-defaults --verbose --help
* To see the current values used by a running server, use the [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables) statement or the Performance Schema system variable tables. See [Section 27.12.14, “Performance Schema System Variable Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-system-variable-tables).

This section provides a description of each system variable. For a system variable summary table, see [Section 5.1.5, “Server System Variable Reference”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variable-reference). For more information about manipulation of system variables, see [Section 5.1.9, “Using System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#using-system-variables).

For additional system variable information, see these sections:

* [Section 5.1.9, “Using System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#using-system-variables), discusses the syntax for setting and displaying system variable values.
* [Section 5.1.9.2, “Dynamic System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dynamic-system-variables), lists the variables that can be set at runtime.
* Information on tuning system variables can be found in [Section 5.1.1, “Configuring the Server”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-configuration).
* [Section 15.14, “InnoDB Startup Options and System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-parameters), lists **InnoDB** system variables.
* [Section 23.3.3.9.2, “NDB Cluster System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#mysql-cluster-system-variables), lists system variables which are specific to NDB Cluster.
* For information on server system variables specific to replication, see [Section 17.1.6, “Replication and Binary Logging Options and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-options).

**Note**

Some of the following variable descriptions refer to “enabling” or “disabling” a variable. These variables can be enabled with the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement by setting them to **ON** or **1**, or disabled by setting them to **OFF** or **0**. Boolean variables can be set at startup to the values **ON**, **TRUE**, **OFF**, and **FALSE** (not case-sensitive), as well as **1** and **0**. See [Section 4.2.2.4, “Program Option Modifiers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-modifiers).

Some system variables control the size of buffers or caches. For a given buffer, the server might need to allocate internal data structures. These structures typically are allocated from the total memory allocated to the buffer, and the amount of space required might be platform dependent. This means that when you assign a value to a system variable that controls a buffer size, the amount of space actually available might differ from the value assigned. In some cases, the amount might be less than the value assigned. It is also possible that the server adjusts a value upward. For example, if you assign a value of 0 to a variable for which the minimal value is 1024, the server sets the value to 1024.

Values for buffer sizes, lengths, and stack sizes are given in bytes unless otherwise specified.

Some system variables take file name values. Unless otherwise specified, the default file location is the data directory if the value is a relative path name. To specify the location explicitly, use an absolute path name. Suppose that the data directory is /var/mysql/data. If a file-valued variable is given as a relative path name, it is located under /var/mysql/data. If the value is an absolute path name, its location is as given by the path name.

* **[activate\_all\_roles\_on\_login](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_activate_all_roles_on_login)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--activate-all-roles-on-login[={OFF|ON}]** |
| **System Variable** | [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether to enable automatic activation of all granted roles when users log in to the server:
  + If [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) is enabled, the server activates all roles granted to each account at login time. This takes precedence over default roles specified with [**SET DEFAULT ROLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-default-role).
  + If [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) is disabled, the server activates the default roles specified with [**SET DEFAULT ROLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-default-role), if any, at login time.

Granted roles include those granted explicitly to the user and those named in the [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) system variable value.

[**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) applies only at login time, and at the beginning of execution for stored programs and views that execute in definer context. To change the active roles within a session, use [**SET ROLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-role). To change the active roles for a stored program, the program body should execute [**SET ROLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-role).

* **[admin\_address](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_address)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-address=addr** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The IP address on which to listen for TCP/IP connections on the administrative network interface (see [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces)). There is no default [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) value. If this variable is not specified at startup, the server maintains no administrative interface. The server also has a [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) system variable for configuring regular (nonadministrative) client TCP/IP connections. See [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces).
* If [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) is specified, its value must satisfy these requirements:
  + The value must be a single IPv4 address, IPv6 address, or host name.
  + The value cannot specify a wildcard address format (**\***, **0.0.0.0**, or **::**).
  + As of MySQL 8.0.22, the value may include a network namespace specifier.

An IP address can be specified as an IPv4 or IPv6 address. If the value is a host name, the server resolves the name to an IP address and binds to that address. If a host name resolves to multiple IP addresses, the server uses the first IPv4 address if there are any, or the first IPv6 address otherwise.

The server treats different types of addresses as follows:

* + If the address is an IPv4-mapped address, the server accepts TCP/IP connections for that address, in either IPv4 or IPv6 format. For example, if the server is bound to **::ffff:127.0.0.1**, clients can connect using --host=127.0.0.1 or --host=::ffff:127.0.0.1.
  + If the address is a “regular” IPv4 or IPv6 address (such as **127.0.0.1** or **::1**), the server accepts TCP/IP connections only for that IPv4 or IPv6 address.

These rules apply to specifying a network namespace for an address:

* + A network namespace can be specified for an IP address or a host name.
  + A network namespace cannot be specified for a wildcard IP address.
  + For a given address, the network namespace is optional. If given, it must be specified as a **/*ns*** suffix immediately following the address.
  + An address with no **/*ns*** suffix uses the host system global namespace. The global namespace is therefore the default.
  + An address with a **/*ns*** suffix uses the namespace named ***ns***.
  + The host system must support network namespaces and each named namespace must previously have been set up. Naming a nonexistent namespace produces an error.

For additional information about network namespaces, see [Section 5.1.14, “Network Namespace Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#network-namespace-support).

If binding to the address fails, the server produces an error and does not start.

The [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) system variable is similar to the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) system variable that binds the server to an address for ordinary client connections, but with these differences:

* + [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) permits multiple addresses. [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) permits a single address.
  + [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) permits wildcard addresses. [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) does not.

* **[admin\_port](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_port)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-port=port\_num** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**admin\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_port) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **33062** |
| **Minimum Value** | **0** |
| **Maximum Value** | **65535** |

* The TCP/IP port number to use for connections on the administrative network interface (see [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces)). Setting this variable to 0 causes the default value to be used.
* Setting [**admin\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_port) has no effect if [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) is not specified because in that case the server maintains no administrative network interface.

* **[admin\_ssl\_ca](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_ca)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-ca=file\_name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_ca) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_ca) system variable is like [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_ssl\_capath](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_capath)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-capath=dir\_name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_capath) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_capath) system variable is like [**ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_capath), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_ssl\_cert](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_cert)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-cert=file\_name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cert) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cert) system variable is like [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_ssl\_cipher](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_cipher)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-cipher=name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cipher) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cipher) system variable is like [**ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cipher), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_ssl\_crl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_crl)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-crl=file\_name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crl) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crl) system variable is like [**ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crl), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_ssl\_crlpath](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_crlpath)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-crlpath=dir\_name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crlpath) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crlpath) system variable is like [**ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crlpath), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_ssl\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_ssl_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-ssl-key=file\_name** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_key) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The [**admin\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_key) system variable is like [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_tls\_ciphersuites](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_tls_ciphersuites)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-tls-ciphersuites=ciphersuite\_list** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_ciphersuites) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **NULL** |

* The [**admin\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_ciphersuites) system variable is like [**tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_ciphersuites), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).

* **[admin\_tls\_version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_admin_tls_version)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--admin-tls-version=protocol\_list** |
| **Introduced** | 8.0.21 |
| **System Variable** | [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **TLSv1,TLSv1.1,TLSv1.2,TLSv1.3** (OpenSSL 1.1.1 and higher)  **TLSv1,TLSv1.1,TLSv1.2** (otherwise) |

* The [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) system variable is like [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version), except that it applies to the administrative connection interface rather than the main connection interface. For information about configuring encryption support for the administrative interface, see [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections).
* **Note**
* As of MySQL 8.0.26, the TLSv1 and TLSv1.1 connection protocols are deprecated and support for them is subject to removal in a future version of MySQL. See [Deprecated TLS Protocols](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-deprecated-protocols).

* **[authentication\_windows\_log\_level](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_authentication_windows_log_level)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--authentication-windows-log-level=#** |
| **System Variable** | [**authentication\_windows\_log\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_authentication_windows_log_level) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **2** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4** |

* This variable is available only if the **authentication\_windows** Windows authentication plugin is enabled and debugging code is enabled. See [Section 6.4.1.6, “Windows Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#windows-pluggable-authentication).
* This variable sets the logging level for the Windows authentication plugin. The following table shows the permitted values.

| **Value** | **Description** |
| --- | --- |
| 0 | No logging |
| 1 | Log only error messages |
| 2 | Log level 1 messages and warning messages |
| 3 | Log level 2 messages and information notes |
| 4 | Log level 3 messages and debug messages |

* **[authentication\_windows\_use\_principal\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_authentication_windows_use_principal_name)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--authentication-windows-use-principal-name[={OFF|ON}]** |
| **System Variable** | [**authentication\_windows\_use\_principal\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_authentication_windows_use_principal_name) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* This variable is available only if the **authentication\_windows** Windows authentication plugin is enabled. See [Section 6.4.1.6, “Windows Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#windows-pluggable-authentication).
* A client that authenticates using the **InitSecurityContext()** function should provide a string identifying the service to which it connects (***targetName***). MySQL uses the principal name (UPN) of the account under which the server is running. The UPN has the form ***user\_id*@*computer\_name*** and need not be registered anywhere to be used. This UPN is sent by the server at the beginning of authentication handshake.
* This variable controls whether the server sends the UPN in the initial challenge. By default, the variable is enabled. For security reasons, it can be disabled to avoid sending the server's account name to a client as cleartext. If the variable is disabled, the server always sends a **0x00** byte in the first challenge, the client does not specify ***targetName***, and as a result, NTLM authentication is used.
* If the server fails to obtain its UPN (which happens primarily in environments that do not support Kerberos authentication), the UPN is not sent by the server and NTLM authentication is used.

* **[autocommit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_autocommit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--autocommit[={OFF|ON}]** |
| **System Variable** | [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* The autocommit mode. If set to 1, all changes to a table take effect immediately. If set to 0, you must use [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) to accept a transaction or [**ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) to cancel it. If [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) is 0 and you change it to 1, MySQL performs an automatic [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) of any open transaction. Another way to begin a transaction is to use a [**START TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) or [**BEGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statement. See [Section 13.3.1, “START TRANSACTION, COMMIT, and ROLLBACK Statements”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit).
* By default, client connections begin with [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) set to 1. To cause clients to begin with a default of 0, set the global [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) value by starting the server with the [--autocommit=0](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) option. To set the variable using an option file, include these lines:
* [mysqld]
* autocommit=0

* **[automatic\_sp\_privileges](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_automatic_sp_privileges)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--automatic-sp-privileges[={OFF|ON}]** |
| **System Variable** | [**automatic\_sp\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* When this variable has a value of 1 (the default), the server automatically grants the [**EXECUTE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_execute) and [**ALTER ROUTINE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_alter-routine) privileges to the creator of a stored routine, if the user cannot already execute and alter or drop the routine. (The [**ALTER ROUTINE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_alter-routine) privilege is required to drop the routine.) The server also automatically drops those privileges from the creator when the routine is dropped. If [**automatic\_sp\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges) is 0, the server does not automatically add or drop these privileges.
* The creator of a routine is the account used to execute the **CREATE** statement for it. This might not be the same as the account named as the **DEFINER** in the routine definition.
* If you start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with [--skip-new](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-new), [**automatic\_sp\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges) is set to **OFF**.
* See also [Section 25.2.2, “Stored Routines and MySQL Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\stored-objects.html#stored-routines-privileges).

* **[auto\_generate\_certs](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_auto_generate_certs)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--auto-generate-certs[={OFF|ON}]** |
| **System Variable** | [**auto\_generate\_certs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_auto_generate_certs) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* This variable controls whether the server autogenerates SSL key and certificate files in the data directory, if they do not already exist.
* At startup, the server automatically generates server-side and client-side SSL certificate and key files in the data directory if the [**auto\_generate\_certs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_auto_generate_certs) system variable is enabled, no SSL options other than [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) are specified, and the server-side SSL files are missing from the data directory. These files enable secure client connections using SSL; see [Section 6.3.1, “Configuring MySQL to Use Encrypted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections).
* For more information about SSL file autogeneration, including file names and characteristics, see [Section 6.3.3.1, “Creating SSL and RSA Certificates and Keys using MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#creating-ssl-rsa-files-using-mysql)
* The [**sha256\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_auto_generate_rsa_keys) and [**caching\_sha2\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_auto_generate_rsa_keys) system variables are related but control autogeneration of RSA key-pair files needed for secure password exchange using RSA over unencypted connections.

* **[avoid\_temporal\_upgrade](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_avoid_temporal_upgrade)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--avoid-temporal-upgrade[={OFF|ON}]** |
| **Deprecated** | Yes |
| **System Variable** | [**avoid\_temporal\_upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_avoid_temporal_upgrade) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable controls whether [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) implicitly upgrades temporal columns found to be in pre-5.6.4 format ([**TIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#time), [**DATETIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime), and [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns without support for fractional seconds precision). Upgrading such columns requires a table rebuild, which prevents any use of fast alterations that might otherwise apply to the operation to be performed.
* This variable is disabled by default. Enabling it causes [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) not to rebuild temporal columns and thereby be able to take advantage of possible fast alterations.
* This variable is deprecated; expect it to be removed in a future MySQL release.

* **[back\_log](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_back_log)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--back-log=#** |
| **System Variable** | [**back\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_back_log) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **-1** (signifies autosizing; do not assign this literal value) |
| **Minimum Value** | **1** |
| **Maximum Value** | **65535** |

* The number of outstanding connection requests MySQL can have. This comes into play when the main MySQL thread gets very many connection requests in a very short time. It then takes some time (although very little) for the main thread to check the connection and start a new thread. The [**back\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_back_log) value indicates how many requests can be stacked during this short time before MySQL momentarily stops answering new requests. You need to increase this only if you expect a large number of connections in a short period of time.
* In other words, this value is the size of the listen queue for incoming TCP/IP connections. Your operating system has its own limit on the size of this queue. The manual page for the Unix **listen()** system call should have more details. Check your OS documentation for the maximum value for this variable. [**back\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_back_log) cannot be set higher than your operating system limit.
* The default value is the value of [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections), which enables the permitted backlog to adjust to the maximum permitted number of connections.

* **[basedir](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_basedir)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--basedir=dir\_name** |
| **System Variable** | [**basedir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_basedir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **parent of mysqld installation directory** |

* The path to the MySQL installation base directory.

* **[big\_tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_big_tables)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--big-tables[={OFF|ON}]** |
| **System Variable** | [**big\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_big_tables) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If enabled, the server stores all temporary tables on disk rather than in memory. This prevents most **The table *tbl\_name* is full** errors for [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) operations that require a large temporary table, but also slows down queries for which in-memory tables would suffice.
* The default value for new connections is **OFF** (use in-memory temporary tables). Normally, it should never be necessary to enable this variable. When in-memory internal temporary tables are managed by the **TempTable** storage engine (the default), and the maximum amount of memory that can be occupied by the **TempTable** storage engine is exceeded, the **TempTable** storage engine starts storing data to temporary files on disk. When in-memory temporary tables are managed by the **MEMORY** storage engine, in-memory tables are automatically converted to disk-based tables as required. For more information, see [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

* **[bind\_address](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_bind_address)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--bind-address=addr** |
| **System Variable** | [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **\*** |

* The MySQL server listens on one or more network sockets for TCP/IP connections. Each socket is bound to one address, but it is possible for an address to map onto multiple network interfaces. To specify how the server should listen for TCP/IP connections, set the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) system variable at server startup. The server also has an [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) system variable that enables administrative connections on a dedicated interface. See [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces).
* If [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) is specified, its value must satisfy these requirements:
  + Prior to MySQL 8.0.13, [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) accepts a single address value, which may specify a single non-wildcard IP address or host name, or one of the wildcard address formats that permit listening on multiple network interfaces (**\***, **0.0.0.0**, or **::**).
  + As of MySQL 8.0.13, [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) accepts either a single value as just described, or a list of comma-separated values. When the variable names a list of multiple values, each value must specify a single non-wildcard IP address (either IPv4 or IPv6) or a host name. Wildcard address formats (**\***, **0.0.0.0**, or **::**) are not allowed in a list of values.
  + As of MySQL 8.0.22, addresses may include a network namespace specifier.

IP addresses can be specified as IPv4 or IPv6 addresses. For any value that is a host name, the server resolves the name to an IP address and binds to that address. If a host name resolves to multiple IP addresses, the server uses the first IPv4 address if there are any, or the first IPv6 address otherwise.

The server treats different types of addresses as follows:

* + If the address is **\***, the server accepts TCP/IP connections on all server host IPv4 interfaces, and, if the server host supports IPv6, on all IPv6 interfaces. Use this address to permit both IPv4 and IPv6 connections on all server interfaces. This value is the default. If the variable specifies a list of multiple values, this value is not permitted.
  + If the address is **0.0.0.0**, the server accepts TCP/IP connections on all server host IPv4 interfaces. If the variable specifies a list of multiple values, this value is not permitted.
  + If the address is **::**, the server accepts TCP/IP connections on all server host IPv4 and IPv6 interfaces. If the variable specifies a list of multiple values, this value is not permitted.
  + If the address is an IPv4-mapped address, the server accepts TCP/IP connections for that address, in either IPv4 or IPv6 format. For example, if the server is bound to **::ffff:127.0.0.1**, clients can connect using --host=127.0.0.1 or --host=::ffff:127.0.0.1.
  + If the address is a “regular” IPv4 or IPv6 address (such as **127.0.0.1** or **::1**), the server accepts TCP/IP connections only for that IPv4 or IPv6 address.

These rules apply to specifying a network namespace for an address:

* + A network namespace can be specified for an IP address or a host name.
  + A network namespace cannot be specified for a wildcard IP address.
  + For a given address, the network namespace is optional. If given, it must be specified as a **/*ns*** suffix immediately following the address.
  + An address with no **/*ns*** suffix uses the host system global namespace. The global namespace is therefore the default.
  + An address with a **/*ns*** suffix uses the namespace named ***ns***.
  + The host system must support network namespaces and each named namespace must previously have been set up. Naming a nonexistent namespace produces an error.
  + If the variable value specifies multiple addresses, it can include addresses in the global namespace, in named namespaces, or a mix.

For additional information about network namespaces, see [Section 5.1.14, “Network Namespace Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#network-namespace-support).

If binding to any address fails, the server produces an error and does not start.

Examples:

* + **bind\_address=\***

The server listens on all IPv4 or IPv6 addresses, as specified by the **\*** wildcard.

* + **bind\_address=198.51.100.20**

The server listens only on the **198.51.100.20** IPv4 address.

* + **bind\_address=198.51.100.20,2001:db8:0:f101::1**

The server listens on the **198.51.100.20** IPv4 address and the **2001:db8:0:f101::1** IPv6 address.

* + **bind\_address=198.51.100.20,\***

This produces an error because wildcard addresses are not permitted when [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) names a list of multiple values.

* + **bind\_address=198.51.100.20/red,2001:db8:0:f101::1/blue,192.0.2.50**

The server listens on the **198.51.100.20** IPv4 address in the **red** namespace, the **2001:db8:0:f101::1** IPv6 address in the **blue** namespace, and the **192.0.2.50** IPv4 address in the global namespace.

When [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) names a single value (wildcard or non-wildcard), the server listens on a single socket, which for a wildcard address may be bound to multiple network interfaces. When [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) names a list of multiple values, the server listens on one socket per value, with each socket bound to a single network interface. The number of sockets is linear with the number of values specified. Depending on operating system connection-acceptance efficiency, long value lists might incur a performance penalty for accepting TCP/IP connections.

Because file descriptors are allocated for listening sockets and network namespace files, it may be necessary to increase the [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) system variable.

If you intend to bind the server to a specific address, be sure that the **mysql.user** system table contains an account with administrative privileges that you can use to connect to that address. Otherwise, you cannot shut down the server. For example, if you bind the server to **\***, you can connect to it using all existing accounts. But if you bind the server to **::1**, it accepts connections only on that address. In that case, first make sure that the **'root'@'::1'** account is present in the **mysql.user** table so you can still connect to the server to shut it down.

* **[block\_encryption\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_block_encryption_mode)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--block-encryption-mode=#** |
| **System Variable** | [**block\_encryption\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_block_encryption_mode) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **aes-128-ecb** |

* This variable controls the block encryption mode for block-based algorithms such as AES. It affects encryption for [**AES\_ENCRYPT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_aes-encrypt) and [**AES\_DECRYPT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_aes-decrypt).
* [**block\_encryption\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_block_encryption_mode) takes a value in **aes-*keylen*-*mode*** format, where ***keylen*** is the key length in bits and ***mode*** is the encryption mode. The value is not case-sensitive. Permitted ***keylen*** values are 128, 192, and 256. Permitted ***mode*** values are **ECB**, **CBC**, **CFB1**, **CFB8**, **CFB128**, and **OFB**.
* For example, this statement causes the AES encryption functions to use a key length of 256 bits and the CBC mode:
* SET block\_encryption\_mode = 'aes-256-cbc';
* An error occurs for attempts to set [**block\_encryption\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_block_encryption_mode) to a value containing an unsupported key length or a mode that the SSL library does not support.

* **[bulk\_insert\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_bulk_insert_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--bulk-insert-buffer-size=#** |
| **System Variable** | [**bulk\_insert\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bulk_insert_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **8388608** |
| **Minimum Value** | **0** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* **MyISAM** uses a special tree-like cache to make bulk inserts faster for [**INSERT ... SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert-select), **INSERT ... VALUES (...), (...), ...**, and [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) when adding data to nonempty tables. This variable limits the size of the cache tree in bytes per thread. Setting it to 0 disables this optimization. The default value is 8MB.
* As of MySQL 8.0.14, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[caching\_sha2\_password\_digest\_rounds](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_caching_sha2_password_digest_rounds)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--caching-sha2-password-digest-rounds=#** |
| **Introduced** | 8.0.24 |
| **System Variable** | [**caching\_sha2\_password\_digest\_rounds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_digest_rounds) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **5000** |
| **Minimum Value** | **5000** |
| **Maximum Value** | **4095000** |

* The number of hash rounds used by the **caching\_sha2\_password** authentication plugin for password storage.
* Increasing the number of hashing rounds above the default value incurs a performance penalty that correlates with the amount of increase:
  + Creating an account that uses the **caching\_sha2\_password** plugin has no impact on the client session within which the account is created, but the server must perform the hashing rounds to complete the operation.
  + For client connections that use the account, the server must perform the hashing rounds and save the result in the cache. The result is longer login time for the first client connection, but not for subsequent connections. This behavior occurs after each server restart.

* **[caching\_sha2\_password\_auto\_generate\_rsa\_keys](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_caching_sha2_password_auto_generate_rsa_keys)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--caching-sha2-password-auto-generate-rsa-keys[={OFF|ON}]** |
| **System Variable** | [**caching\_sha2\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_auto_generate_rsa_keys) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* The server uses this variable to determine whether to autogenerate RSA private/public key-pair files in the data directory if they do not already exist.
* At startup, the server automatically generates RSA private/public key-pair files in the data directory if all of these conditions are true: The [**sha256\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_auto_generate_rsa_keys) or [**caching\_sha2\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_auto_generate_rsa_keys) system variable is enabled; no RSA options are specified; the RSA files are missing from the data directory. These key-pair files enable secure password exchange using RSA over unencrypted connections for accounts authenticated by the **sha256\_password** or **caching\_sha2\_password** plugin; see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sha256-pluggable-authentication), and [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#caching-sha2-pluggable-authentication).
* For more information about RSA file autogeneration, including file names and characteristics, see [Section 6.3.3.1, “Creating SSL and RSA Certificates and Keys using MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#creating-ssl-rsa-files-using-mysql)
* The [**auto\_generate\_certs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_auto_generate_certs) system variable is related but controls autogeneration of SSL certificate and key files needed for secure connections using SSL.

* **[caching\_sha2\_password\_private\_key\_path](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_caching_sha2_password_private_key_path)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--caching-sha2-password-private-key-path=file\_name** |
| **System Variable** | [**caching\_sha2\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_private_key_path) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **private\_key.pem** |

* This variable specifies the path name of the RSA private key file for the **caching\_sha2\_password** authentication plugin. If the file is named as a relative path, it is interpreted relative to the server data directory. The file must be in PEM format.
* **Important**
* Because this file stores a private key, its access mode should be restricted so that only the MySQL server can read it.
* For information about **caching\_sha2\_password**, see [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#caching-sha2-pluggable-authentication).

* **[caching\_sha2\_password\_public\_key\_path](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_caching_sha2_password_public_key_path)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--caching-sha2-password-public-key-path=file\_name** |
| **System Variable** | [**caching\_sha2\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_public_key_path) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **public\_key.pem** |

* This variable specifies the path name of the RSA public key file for the **caching\_sha2\_password** authentication plugin. If the file is named as a relative path, it is interpreted relative to the server data directory. The file must be in PEM format.
* For information about **caching\_sha2\_password**, including information about how clients request the RSA public key, see [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#caching-sha2-pluggable-authentication).

* **[character\_set\_client](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_client)**

|  |  |
| --- | --- |
| **System Variable** | [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4** |

* The character set for statements that arrive from the client. The session value of this variable is set using the character set requested by the client when the client connects to the server. (Many clients support a --default-character-set option to enable this character set to be specified explicitly. See also [Section 10.4, “Connection Character Sets and Collations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-connection).) The global value of the variable is used to set the session value in cases when the client-requested value is unknown or not available, or the server is configured to ignore client requests:
  + The client requests a character set not known to the server. For example, a Japanese-enabled client requests **sjis** when connecting to a server not configured with **sjis** support.
  + The client is from a version of MySQL older than MySQL 4.1, and thus does not request a character set.
  + [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) was started with the [--skip-character-set-client-handshake](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_character-set-client-handshake) option, which causes it to ignore client character set configuration. This reproduces MySQL 4.0 behavior and is useful should you wish to upgrade the server without upgrading all the clients.

Some character sets cannot be used as the client character set. Attempting to use them as the [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) value produces an error. See [Impermissible Client Character Sets](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-connection-impermissible-client-charset).

* **[character\_set\_connection](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_connection)**

|  |  |
| --- | --- |
| **System Variable** | [**character\_set\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_connection) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4** |

* The character set used for literals specified without a character set introducer and for number-to-string conversion. For information about introducers, see [Section 10.3.8, “Character Set Introducers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-introducer).

* **[character\_set\_database](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_database)**

|  |  |
| --- | --- |
| **System Variable** | [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4** |
| **Footnote** | This option is dynamic, but should be set only by server. You should not set this variable manually. |

* The character set used by the default database. The server sets this variable whenever the default database changes. If there is no default database, the variable has the same value as [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server).
* As of MySQL 8.0.14, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).
* The global [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) and [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) system variables are deprecated; expect them to be removed in a future version of MySQL.
* Assigning a value to the session [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) and [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) system variables is deprecated and assignments produce a warning. Expect the session variables to become read-only (and assignments to them to produce an error) in a future version of MySQL in which it remains possible to access the session variables to determine the database character set and collation for the default database.

* **[character\_set\_filesystem](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_filesystem)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--character-set-filesystem=name** |
| **System Variable** | [**character\_set\_filesystem**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_filesystem) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **binary** |

* The file system character set. This variable is used to interpret string literals that refer to file names, such as in the [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) and [**SELECT ... INTO OUTFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into) statements and the [**LOAD\_FILE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_load-file) function. Such file names are converted from [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) to [**character\_set\_filesystem**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_filesystem) before the file opening attempt occurs. The default value is **binary**, which means that no conversion occurs. For systems on which multibyte file names are permitted, a different value may be more appropriate. For example, if the system represents file names using UTF-8, set [**character\_set\_filesystem**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_filesystem) to **'utf8mb4'**.
* As of MySQL 8.0.14, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[character\_set\_results](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_results)**

|  |  |
| --- | --- |
| **System Variable** | [**character\_set\_results**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_results) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4** |

* The character set used for returning query results to the client. This includes result data such as column values, result metadata such as column names, and error messages.

* **[character\_set\_server](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_server)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--character-set-server=name** |
| **System Variable** | [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4** |

* The servers default character set. See [Section 10.15, “Character Set Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-configuration). If you set this variable, you should also set [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server) to specify the collation for the character set.

* **[character\_set\_system](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_set_system)**

|  |  |
| --- | --- |
| **System Variable** | [**character\_set\_system**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_system) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8** |

* The character set used by the server for storing identifiers. The value is always **utf8**.

* **[character\_sets\_dir](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_character_sets_dir)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--character-sets-dir=dir\_name** |
| **System Variable** | [**character\_sets\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_sets_dir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The directory where character sets are installed. See [Section 10.15, “Character Set Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-configuration).

* **[check\_proxy\_users](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_check_proxy_users)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--check-proxy-users[={OFF|ON}]** |
| **System Variable** | [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Some authentication plugins implement proxy user mapping for themselves (for example, the PAM and Windows authentication plugins). Other authentication plugins do not support proxy users by default. Of these, some can request that the MySQL server itself map proxy users according to granted proxy privileges: **mysql\_native\_password**, **sha256\_password**.
* If the [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) system variable is enabled, the server performs proxy user mapping for any authentication plugins that make such a request. However, it may also be necessary to enable plugin-specific system variables to take advantage of server proxy user mapping support:
  + For the **mysql\_native\_password** plugin, enable [**mysql\_native\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mysql_native_password_proxy_users).
  + For the **sha256\_password** plugin, enable [**sha256\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_proxy_users).

For information about user proxying, see [Section 6.2.18, “Proxy Users”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#proxy-users).

* **[collation\_connection](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_collation_connection)**

|  |  |
| --- | --- |
| **System Variable** | [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The collation of the connection character set. [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection) is important for comparisons of literal strings. For comparisons of strings with column values, [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection) does not matter because columns have their own collation, which has a higher collation precedence (see [Section 10.8.4, “Collation Coercibility in Expressions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-collation-coercibility)).

* **[collation\_database](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_collation_database)**

|  |  |
| --- | --- |
| **System Variable** | [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4\_0900\_ai\_ci** |
| **Footnote** | This option is dynamic, but should be set only by server. You should not set this variable manually. |

* The collation used by the default database. The server sets this variable whenever the default database changes. If there is no default database, the variable has the same value as [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server).
* As of MySQL 8.0.18, setting the session value of this system variable is no longer a restricted operation.
* The global [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) and [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) system variables are deprecated; expect them to be removed in a future version of MySQL.
* Assigning a value to the session [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) and [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) system variables is deprecated and assignments produce a warning. Expect the session variables to become read-only (and assignments to produce an error) in a future version of MySQL in which it remains possible to access the session variables to determine the database character set and collation for the default database.

* **[collation\_server](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_collation_server)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--collation-server=name** |
| **System Variable** | [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **utf8mb4\_0900\_ai\_ci** |

* The server's default collation. See [Section 10.15, “Character Set Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-configuration).

* **[completion\_type](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_completion_type)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--completion-type=#** |
| **System Variable** | [**completion\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_completion_type) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **NO\_CHAIN** |
| **Valid Values** | **NO\_CHAIN**  **CHAIN**  **RELEASE**  **0**  **1**  **2** |

* The transaction completion type. This variable can take the values shown in the following table. The variable can be assigned using either the name values or corresponding integer values.

| **Value** | **Description** |
| --- | --- |
| **NO\_CHAIN** (or 0) | [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) and [**ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) are unaffected. This is the default value. |
| **CHAIN** (or 1) | [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) and [**ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) are equivalent to **COMMIT AND CHAIN** and **ROLLBACK AND CHAIN**, respectively. (A new transaction starts immediately with the same isolation level as the just-terminated transaction.) |
| **RELEASE** (or 2) | [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) and [**ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) are equivalent to **COMMIT RELEASE** and **ROLLBACK RELEASE**, respectively. (The server disconnects after terminating the transaction.) |

* [**completion\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_completion_type) affects transactions that begin with [**START TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) or [**BEGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) and end with [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) or [**ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit). It does not apply to implicit commits resulting from execution of the statements listed in [Section 13.3.3, “Statements That Cause an Implicit Commit”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#implicit-commit). It also does not apply for [**XA COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#xa-statements), [**XA ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#xa-statements), or when [**autocommit=1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit).

* **[concurrent\_insert](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_concurrent_insert)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--concurrent-insert[=value]** |
| **System Variable** | [**concurrent\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_concurrent_insert) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **AUTO** |
| **Valid Values** | **NEVER**  **AUTO**  **ALWAYS**  **0**  **1**  **2** |

* If **AUTO** (the default), MySQL permits [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) and [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements to run concurrently for **MyISAM** tables that have no free blocks in the middle of the data file.
* This variable can take the values shown in the following table. The variable can be assigned using either the name values or corresponding integer values.

| **Value** | **Description** |
| --- | --- |
| **NEVER** (or 0) | Disables concurrent inserts |
| **AUTO** (or 1) | (Default) Enables concurrent insert for **MyISAM** tables that do not have holes |
| **ALWAYS** (or 2) | Enables concurrent inserts for all **MyISAM** tables, even those that have holes. For a table with a hole, new rows are inserted at the end of the table if it is in use by another thread. Otherwise, MySQL acquires a normal write lock and inserts the row into the hole. |

* If you start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with [--skip-new](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-new), [**concurrent\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_concurrent_insert) is set to **NEVER**.
* See also [Section 8.11.3, “Concurrent Inserts”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#concurrent-inserts).

* **[connect\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_connect_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--connect-timeout=#** |
| **System Variable** | [**connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_connect_timeout) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **10** |
| **Minimum Value** | **2** |
| **Maximum Value** | **31536000** |

* The number of seconds that the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server waits for a connect packet before responding with **Bad handshake**. The default value is 10 seconds.
* Increasing the [**connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_connect_timeout) value might help if clients frequently encounter errors of the form **Lost connection to MySQL server at '*XXX*', system error: *errno***.

* **[core\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_core_file)**

|  |  |
| --- | --- |
| **System Variable** | [**core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_core_file) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether to write a core file if the server unexpectedly exits. This variable is set by the [--core-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_core-file) option.

* **[create\_admin\_listener\_thread](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_create_admin_listener_thread)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--create-admin-listener-thread[={OFF|ON}]** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**create\_admin\_listener\_thread**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_create_admin_listener_thread) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether to use a dedicated listening thread for client connections on the administrative network interface (see [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces)). The default is **OFF**; that is, the manager thread for ordinary connections on the main interface also handles connections for the administrative interface.
* Depending on factors such as platform type and workload, you may find one setting for this variable yields better performance than the other setting.
* Setting [**create\_admin\_listener\_thread**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_create_admin_listener_thread) has no effect if [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) is not specified because in that case the server maintains no administrative network interface.

* **[cte\_max\_recursion\_depth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_cte_max_recursion_depth)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--cte-max-recursion-depth=#** |
| **System Variable** | [**cte\_max\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_cte_max_recursion_depth) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1000** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4294967295** |

* The common table expression (CTE) maximum recursion depth. The server terminates execution of any CTE that recurses more levels than the value of this variable. For more information, see [Limiting Common Table Expression Recursion](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#common-table-expressions-recursion-limits).

* **[datadir](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_datadir)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--datadir=dir\_name** |
| **System Variable** | [**datadir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The path to the MySQL server data directory. Relative paths are resolved with respect to the current directory. If you expect the server to be started automatically (that is, in contexts for which you cannot know the current directory in advance), it is best to specify the [**datadir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) value as an absolute path.

* **[debug](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_debug)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--debug[=debug\_options]** |
| **System Variable** | [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value (Unix)** | **d:t:i:o,/tmp/mysqld.trace** |
| **Default Value (Windows)** | **d:t:i:O,\mysqld.trace** |

* This variable indicates the current debugging settings. It is available only for servers built with debugging support. The initial value comes from the value of instances of the [--debug](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) option given at server startup. The global and session values may be set at runtime.
* Setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).
* Assigning a value that begins with **+** or **-** cause the value to added to or subtracted from the current value:
* mysql> **SET debug = 'T';**
* mysql> **SELECT @@debug;**
* +---------+
* | @@debug |
* +---------+
* | T |
* +---------+
* mysql> **SET debug = '+P';**
* mysql> **SELECT @@debug;**
* +---------+
* | @@debug |
* +---------+
* | P:T |
* +---------+
* mysql> **SET debug = '-P';**
* mysql> **SELECT @@debug;**
* +---------+
* | @@debug |
* +---------+
* | T |
* +---------+
* For more information, see [Section 5.9.4, “The DBUG Package”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dbug-package).

* **[debug\_sync](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_debug_sync)**

|  |  |
| --- | --- |
| **System Variable** | [**debug\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug_sync) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* This variable is the user interface to the Debug Sync facility. Use of Debug Sync requires that MySQL be configured with the [-DENABLE\_DEBUG\_SYNC=1](https://dev.mysql.com/doc/refman/5.6/en/source-configuration-options.html#option_cmake_enable_debug_sync) **CMake** option (see [Section 2.9.7, “MySQL Source-Configuration Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#source-configuration-options)). If Debug Sync is not compiled in, this system variable is not available.
* The global variable value is read only and indicates whether the facility is enabled. By default, Debug Sync is disabled and the value of [**debug\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug_sync) is **OFF**. If the server is started with [--debug-sync-timeout=***N***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug-sync-timeout), where ***N*** is a timeout value greater than 0, Debug Sync is enabled and the value of [**debug\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug_sync) is **ON - current signal** followed by the signal name. Also, ***N*** becomes the default timeout for individual synchronization points.
* The session value can be read by any user and has the same value as the global variable. The session value can be set to control synchronization points.
* Setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).
* For a description of the Debug Sync facility and how to use synchronization points, see [MySQL Internals: Test Synchronization](https://dev.mysql.com/doc/internals/en/test-synchronization.html).

* **[default\_authentication\_plugin](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_authentication_plugin)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-authentication-plugin=plugin\_name** |
| **System Variable** | [**default\_authentication\_plugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_authentication_plugin) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **caching\_sha2\_password** |
| **Valid Values** | **mysql\_native\_password**  **sha256\_password**  **caching\_sha2\_password** |

* The default authentication plugin. These values are permitted:
  + **mysql\_native\_password**: Use MySQL native passwords; see [Section 6.4.1.1, “Native Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#native-pluggable-authentication).
  + **sha256\_password**: Use SHA-256 passwords; see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sha256-pluggable-authentication).
  + **caching\_sha2\_password**: Use SHA-256 passwords; see [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#caching-sha2-pluggable-authentication).

**Note**

In MySQL 8.0, **caching\_sha2\_password** is the default authentication plugin rather than **mysql\_native\_password**. For information about the implications of this change for server operation and compatibility of the server with clients and connectors, see [caching\_sha2\_password as the Preferred Authentication Plugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#upgrade-caching-sha2-password).

The [**default\_authentication\_plugin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_authentication_plugin) value affects these aspects of server operation:

* + It determines which authentication plugin the server assigns to new accounts created by [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) and [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant) statements that do not explicitly specify an authentication plugin.
  + For an account created with the following statement, the server associates the account with the default authentication plugin and assigns the account the given password, hashed as required by that plugin:
  + CREATE USER ... IDENTIFIED BY '***cleartext password***';

* **[default\_collation\_for\_utf8mb4](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_collation_for_utf8mb4)**

|  |  |
| --- | --- |
| **System Variable** | [**default\_collation\_for\_utf8mb4**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_collation_for_utf8mb4) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Valid Values** | **utf8mb4\_0900\_ai\_ci**  **utf8mb4\_general\_ci** |

* For internal use by replication. This system variable is set to the default collation for the **utf8mb4** character set. The value of the variable is replicated from a source to a replica so that the replica can correctly process data originating from a source with a different default collation for **utf8mb4**. This variable is primarily intended to support replication from a MySQL 5.7 or older replication source server to a MySQL 8.0 replica server, or group replication with a MySQL 5.7 primary node and one or more MySQL 8.0 secondaries. The default collation for **utf8mb4** in MySQL 5.7 is **utf8mb4\_general\_ci**, but **utf8mb4\_0900\_ai\_ci** in MySQL 8.0. The variable is not present in releases earlier than MySQL 8.0, so if the replica does not receive a value for the variable, it assumes the source is from an earlier release and sets the value to the previous default collation **utf8mb4\_general\_ci**.
* As of MySQL 8.0.18, setting the session value of this system variable is no longer a restricted operation.
* The default **utf8mb4** collation is used in the following statements:
  + [**SHOW COLLATION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-collation) and [**SHOW CHARACTER SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-character-set).
  + [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) and [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) having a **CHARACTER SET utf8mb4** clause without a **COLLATION** clause, either for the table character set or for a column character set.
  + [**CREATE DATABASE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-database) and [**ALTER DATABASE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-database) having a **CHARACTER SET utf8mb4** clause without a **COLLATION** clause.
  + Any statement containing a string literal of the form **\_utf8mb4'*some text*'** without a **COLLATE** clause.

* **[default\_password\_lifetime](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_password_lifetime)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-password-lifetime=#** |
| **System Variable** | [**default\_password\_lifetime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_password_lifetime) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **65535** |

* This variable defines the global automatic password expiration policy. The default [**default\_password\_lifetime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_password_lifetime) value is 0, which disables automatic password expiration. If the value of [**default\_password\_lifetime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_password_lifetime) is a positive integer ***N***, it indicates the permitted password lifetime; passwords must be changed every ***N*** days.
* The global password expiration policy can be overridden as desired for individual accounts using the password expiration option of the [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) and [**ALTER USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-user) statements. See [Section 6.2.15, “Password Management”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-management).

* **[default\_storage\_engine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_storage_engine)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-storage-engine=name** |
| **System Variable** | [**default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **InnoDB** |

* The default storage engine for tables. See [Chapter 16, *Alternative Storage Engines*](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html). This variable sets the storage engine for permanent tables only. To set the storage engine for **TEMPORARY** tables, set the [**default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) system variable.
* To see which storage engines are available and enabled, use the [**SHOW ENGINES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-engines) statement or query the **INFORMATION\_SCHEMA** [**ENGINES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-engines-table) table.
* If you disable the default storage engine at server startup, you must set the default engine for both permanent and **TEMPORARY** tables to a different engine, or else the server does not start.

* **[default\_table\_encryption](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_table_encryption)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-table-encryption[={OFF|ON}]** |
| **Introduced** | 8.0.16 |
| **System Variable** | [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Defines the default encryption setting applied to schemas and general tablespaces when they are created without specifying an **ENCRYPTION** clause.
* The [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) variable is only applicable to user-created schemas and general tablespaces. It does not govern encryption of the **mysql** system tablespace.
* Setting the runtime value of [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) and [**TABLE\_ENCRYPTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_table-encryption-admin) privileges, or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege.
* [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) supports [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) and [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax. See [Section 5.1.9.3, “Persisted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables).
* For more information, see [Defining an Encryption Default for Schemas and General Tablespaces](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-schema-tablespace-encryption-default).

* **[default\_tmp\_storage\_engine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_tmp_storage_engine)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-tmp-storage-engine=name** |
| **System Variable** | [**default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Enumeration |
| **Default Value** | **InnoDB** |

* The default storage engine for **TEMPORARY** tables (created with [**CREATE TEMPORARY TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table)). To set the storage engine for permanent tables, set the [**default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) system variable. Also see the discussion of that variable regarding possible values.
* If you disable the default storage engine at server startup, you must set the default engine for both permanent and **TEMPORARY** tables to a different engine, or else the server does not start.

* **[default\_week\_format](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_default_week_format)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--default-week-format=#** |
| **System Variable** | [**default\_week\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_week_format) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **7** |

* The default mode value to use for the [**WEEK()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_week) function. See [Section 12.7, “Date and Time Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#date-and-time-functions).

* **[delay\_key\_write](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_delay_key_write)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--delay-key-write[={OFF|ON|ALL}]** |
| **System Variable** | [**delay\_key\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delay_key_write) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **ON** |
| **Valid Values** | **ON**  **OFF**  **ALL** |

* This variable specifies how to use delayed key writes. It applies only to **MyISAM** tables. Delayed key writing causes key buffers not to be flushed between writes. See also [Section 16.2.1, “MyISAM Startup Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-start).
* This variable can have one of the following values to affect handling of the **DELAY\_KEY\_WRITE** table option that can be used in [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statements.

| **Option** | **Description** |
| --- | --- |
| **OFF** | **DELAY\_KEY\_WRITE** is ignored. |
| **ON** | MySQL honors any **DELAY\_KEY\_WRITE** option specified in [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statements. This is the default value. |
| **ALL** | All new opened tables are treated as if they were created with the **DELAY\_KEY\_WRITE** option enabled. |

* **Note**
* If you set this variable to **ALL**, you should not use **MyISAM** tables from within another program (such as another MySQL server or [**myisamchk**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#myisamchk)) when the tables are in use. Doing so leads to index corruption.
* If **DELAY\_KEY\_WRITE** is enabled for a table, the key buffer is not flushed for the table on every index update, but only when the table is closed. This speeds up writes on keys a lot, but if you use this feature, you should add automatic checking of all **MyISAM** tables by starting the server with the [**myisam\_recover\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_recover_options) system variable set (for example, **myisam\_recover\_options='BACKUP,FORCE'**). See [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables), and [Section 16.2.1, “MyISAM Startup Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-start).
* If you start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with [--skip-new](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-new), [**delay\_key\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delay_key_write) is set to **OFF**.
* **Warning**
* If you enable external locking with [--external-locking](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_external-locking), there is no protection against index corruption for tables that use delayed key writes.

* **[delayed\_insert\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_delayed_insert_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--delayed-insert-limit=#** |
| **Deprecated** | Yes |
| **System Variable** | [**delayed\_insert\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_limit) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **100** |
| **Minimum Value** | **1** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* This system variable is deprecated (because **DELAYED** inserts are not supported), and you should expect it to be removed in a future release.

* **[delayed\_insert\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_delayed_insert_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--delayed-insert-timeout=#** |
| **Deprecated** | Yes |
| **System Variable** | [**delayed\_insert\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_timeout) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **300** |

* This system variable is deprecated (because **DELAYED** inserts are not supported), and you should expect it to be removed in a future release.

* **[delayed\_queue\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_delayed_queue_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--delayed-queue-size=#** |
| **Deprecated** | Yes |
| **System Variable** | [**delayed\_queue\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_queue_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1000** |
| **Minimum Value** | **1** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* This system variable is deprecated (because **DELAYED** inserts are not supported), and you should expect it to be removed in a future release.

* **[disabled\_storage\_engines](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_disabled_storage_engines)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--disabled-storage-engines=engine[,engine]...** |
| **System Variable** | [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **empty string** |

* This variable indicates which storage engines cannot be used to create tables or tablespaces. For example, to prevent new **MyISAM** or **FEDERATED** tables from being created, start the server with these lines in the server option file:
* [mysqld]
* disabled\_storage\_engines="MyISAM,FEDERATED"
* By default, [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) is empty (no engines disabled), but it can be set to a comma-separated list of one or more engines (not case-sensitive). Any engine named in the value cannot be used to create tables or tablespaces with [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) or [**CREATE TABLESPACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-tablespace), and cannot be used with [**ALTER TABLE ... ENGINE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) or [**ALTER TABLESPACE ... ENGINE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-tablespace) to change the storage engine of existing tables or tablespaces. Attempts to do so result in an [**ER\_DISABLED\_STORAGE\_ENGINE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_disabled_storage_engine) error.
* [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) does not restrict other DDL statements for existing tables, such as [**CREATE INDEX**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-index), [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table), [**ANALYZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table), [**DROP TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-table), or [**DROP TABLESPACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-tablespace). This permits a smooth transition so that existing tables or tablespaces that use a disabled engine can be migrated to a permitted engine by means such as [**ALTER TABLE ... ENGINE *permitted\_engine***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table).
* It is permitted to set the [**default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) or [**default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) system variable to a storage engine that is disabled. This could cause applications to behave erratically or fail, although that might be a useful technique in a development environment for identifying applications that use disabled engines, so that they can be modified.
* [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) is disabled and has no effect if the server is started with any of these options: [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize), [--initialize-insecure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure), [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables).
* **Note**
* Setting [**disabled\_storage\_engines**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disabled_storage_engines) might cause an issue with [**mysql\_upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-upgrade). For details, see [Section 4.4.5, “mysql\_upgrade — Check and Upgrade MySQL Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-upgrade).

* **[disconnect\_on\_expired\_password](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_disconnect_on_expired_password)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--disconnect-on-expired-password[={OFF|ON}]** |
| **System Variable** | [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* This variable controls how the server handles clients with expired passwords:
  + If the client indicates that it can handle expired passwords, the value of [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password) is irrelevant. The server permits the client to connect but puts it in sandbox mode.
  + If the client does not indicate that it can handle expired passwords, the server handles the client according to the value of [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password):
    - If [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password): is enabled, the server disconnects the client.
    - If [**disconnect\_on\_expired\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_disconnect_on_expired_password): is disabled, the server permits the client to connect but puts it in sandbox mode.

For more information about the interaction of client and server settings relating to expired-password handling, see [Section 6.2.16, “Server Handling of Expired Passwords”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#expired-password-handling).

* **[div\_precision\_increment](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_div_precision_increment)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--div-precision-increment=#** |
| **System Variable** | [**div\_precision\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_div_precision_increment) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **4** |
| **Minimum Value** | **0** |
| **Maximum Value** | **30** |

* This variable indicates the number of digits by which to increase the scale of the result of division operations performed with the [**/**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_divide) operator. The default value is 4. The minimum and maximum values are 0 and 30, respectively. The following example illustrates the effect of increasing the default value.
* mysql> **SELECT 1/7;**
* +--------+
* | 1/7 |
* +--------+
* | 0.1429 |
* +--------+
* mysql> **SET div\_precision\_increment = 12;**
* mysql> **SELECT 1/7;**
* +----------------+
* | 1/7 |
* +----------------+
* | 0.142857142857 |
* +----------------+

* **[dragnet.log\_error\_filter\_rules](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_dragnet.log_error_filter_rules)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--dragnet.log-error-filter-rules=value** |
| **System Variable** | [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **IF prio>=INFORMATION THEN drop. IF EXISTS source\_line THEN unset source\_line.** |

* The filter rules that control operation of the **log\_filter\_dragnet** error log filter component. If **log\_filter\_dragnet** is not installed, [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) is unavailable. If **log\_filter\_dragnet** is installed but not enabled, changes to [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) have no effect.
* The effect of the default value is similar to the filtering performed by the **log\_sink\_internal** filter with a setting of [**log\_error\_verbosity=2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity).
* As of MySQL 8.0.12, the [**dragnet.Status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_dragnet.Status) status variable can be consulted to determine the result of the most recent assignment to [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules).
* Prior to MySQL 8.0.12, successful assignments to [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) at runtime produce a note confirming the new value:
* mysql> **SET GLOBAL dragnet.log\_error\_filter\_rules = 'IF prio <> 0 THEN unset prio.';**
* Query OK, 0 rows affected, 1 warning (0.00 sec)
* mysql> **SHOW WARNINGS\G**
* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
* Level: Note
* Code: 4569
* Message: filter configuration accepted:
* SET @@GLOBAL.dragnet.log\_error\_filter\_rules=
* 'IF prio!=ERROR THEN unset prio.';
* The value displayed by [**SHOW WARNINGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings) indicates the “decompiled” canonical representation after the rule set has been successfully parsed and compiled into internal form. Semantically, this canonical form is identical to the value assigned to [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules), but there may be some differences between the assigned and canonical values, as illustrated by the preceding example:
  + The **<>** operator is changed to **!=**.
  + The numeric priority of 0 is changed to the corresponding priority symbol **ERROR**.
  + Optional spaces are removed.

For additional information, see [Section 5.4.2.4, “Types of Error Log Filtering”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-filtering), and [Section 5.5.3, “Error Log Components”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-components).

* **[end\_markers\_in\_json](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_end_markers_in_json)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--end-markers-in-json[={OFF|ON}]** |
| **System Variable** | [**end\_markers\_in\_json**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_end_markers_in_json) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether optimizer JSON output should add end markers. See [MySQL Internals: The end\_markers\_in\_json System Variable](https://dev.mysql.com/doc/internals/en/end-markers-in-json-system-variable.html).

* **[eq\_range\_index\_dive\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_eq_range_index_dive_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--eq-range-index-dive-limit=#** |
| **System Variable** | [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **200** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4294967295** |

* This variable indicates the number of equality ranges in an equality comparison condition when the optimizer should switch from using index dives to index statistics in estimating the number of qualifying rows. It applies to evaluation of expressions that have either of these equivalent forms, where the optimizer uses a nonunique index to look up ***col\_name*** values:
* ***col\_name*** IN(***val1***, ..., ***valN***)
* ***col\_name*** = ***val1*** OR ... OR ***col\_name*** = ***valN***
* In both cases, the expression contains ***N*** equality ranges. The optimizer can make row estimates using index dives or index statistics. If [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) is greater than 0, the optimizer uses existing index statistics instead of index dives if there are [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) or more equality ranges. Thus, to permit use of index dives for up to ***N*** equality ranges, set [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) to ***N*** + 1. To disable use of index statistics and always use index dives regardless of ***N***, set [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) to 0.
* For more information, see [Equality Range Optimization of Many-Valued Comparisons](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#equality-range-optimization).
* To update table index statistics for best estimates, use [**ANALYZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table).

* **[error\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_error_count)**

The number of errors that resulted from the last statement that generated messages. This variable is read only. See [Section 13.7.7.17, “SHOW ERRORS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-errors).

* **[event\_scheduler](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_event_scheduler)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--event-scheduler[=value]** |
| **System Variable** | [**event\_scheduler**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_event_scheduler) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **ON** |
| **Valid Values** | **ON**  **OFF**  **DISABLED** |

* This variable enables or disables, and starts or stops, the Event Scheduler. The possible status values are **ON**, **OFF**, and **DISABLED**, with the default being **OFF**. Turning the Event Scheduler **OFF** is not the same as disabling the Event Scheduler, which requires setting the status to **DISABLED**. This variable and its effects on the Event Scheduler's operation are discussed in greater detail in [Section 25.4.2, “Event Scheduler Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\stored-objects.html#events-configuration)

* **[explicit\_defaults\_for\_timestamp](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_explicit_defaults_for_timestamp)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--explicit-defaults-for-timestamp[={OFF|ON}]** |
| **Deprecated** | Yes |
| **System Variable** | [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* This system variable determines whether the server enables certain nonstandard behaviors for default values and **NULL**-value handling in [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns. By default, [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) is enabled, which disables the nonstandard behaviors. Disabling [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) results in a warning.
* As of MySQL 8.0.18, setting the session value of this system variable is no longer a restricted operation.
* If [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) is disabled, the server enables the nonstandard behaviors and handles [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns as follows:
  + [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns not explicitly declared with the **NULL** attribute are automatically declared with the **NOT NULL** attribute. Assigning such a column a value of **NULL** is permitted and sets the column to the current timestamp. Exception: As of MySQL 8.0.22, attempting to insert **NULL** into a generated column declared as **TIMESTAMP NOT NULL** is rejected with an error.
  + The first [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) column in a table, if not explicitly declared with the **NULL** attribute or an explicit **DEFAULT** or **ON UPDATE** attribute, is automatically declared with the **DEFAULT CURRENT\_TIMESTAMP** and **ON UPDATE CURRENT\_TIMESTAMP** attributes.
  + [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns following the first one, if not explicitly declared with the **NULL** attribute or an explicit **DEFAULT** attribute, are automatically declared as **DEFAULT '0000-00-00 00:00:00'** (the “zero” timestamp). For inserted rows that specify no explicit value for such a column, the column is assigned **'0000-00-00 00:00:00'** and no warning occurs.

Depending on whether strict SQL mode or the [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) SQL mode is enabled, a default value of **'0000-00-00 00:00:00'** may be invalid. Be aware that the [**TRADITIONAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_traditional) SQL mode includes strict mode and [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date). See [Section 5.1.11, “Server SQL Modes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode).

* The nonstandard behaviors just described are deprecated; expect them to be removed in a future MySQL release.
* If [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) is enabled, the server disables the nonstandard behaviors and handles [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns as follows:
  + It is not possible to assign a [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) column a value of **NULL** to set it to the current timestamp. To assign the current timestamp, set the column to [**CURRENT\_TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_current-timestamp) or a synonym such as [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now).
  + [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns not explicitly declared with the **NOT NULL** attribute are automatically declared with the **NULL** attribute and permit **NULL** values. Assigning such a column a value of **NULL** sets it to **NULL**, not the current timestamp.
  + [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns declared with the **NOT NULL** attribute do not permit **NULL** values. For inserts that specify **NULL** for such a column, the result is either an error for a single-row insert if strict SQL mode is enabled, or **'0000-00-00 00:00:00'** is inserted for multiple-row inserts with strict SQL mode disabled. In no case does assigning the column a value of **NULL** set it to the current timestamp.
  + [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns explicitly declared with the **NOT NULL** attribute and without an explicit **DEFAULT** attribute are treated as having no default value. For inserted rows that specify no explicit value for such a column, the result depends on the SQL mode. If strict SQL mode is enabled, an error occurs. If strict SQL mode is not enabled, the column is declared with the implicit default of **'0000-00-00 00:00:00'** and a warning occurs. This is similar to how MySQL treats other temporal types such as [**DATETIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime).
  + No [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) column is automatically declared with the **DEFAULT CURRENT\_TIMESTAMP** or **ON UPDATE CURRENT\_TIMESTAMP** attributes. Those attributes must be explicitly specified.
  + The first [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) column in a table is not handled differently from [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns following the first one.

If [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) is disabled at server startup, this warning appears in the error log:

[Warning] TIMESTAMP with implicit DEFAULT value is deprecated.

Please use --explicit\_defaults\_for\_timestamp server option (see

documentation for more details).

As indicated by the warning, to disable the deprecated nonstandard behaviors, enable the [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) system variable at server startup.

**Note**

[**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) is itself deprecated because its only purpose is to permit control over deprecated [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) behaviors that are to be removed in a future MySQL release. When removal of those behaviors occurs, expect [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) to be removed as well.

For additional information, see [Section 11.2.5, “Automatic Initialization and Updating for TIMESTAMP and DATETIME”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#timestamp-initialization).

* **[external\_user](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_external_user)**

|  |  |
| --- | --- |
| **System Variable** | [**external\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_external_user) |
| **Scope** | Session |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The external user name used during the authentication process, as set by the plugin used to authenticate the client. With native (built-in) MySQL authentication, or if the plugin does not set the value, this variable is **NULL**. See [Section 6.2.18, “Proxy Users”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#proxy-users).

* **[flush](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_flush)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--flush[={OFF|ON}]** |
| **System Variable** | [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If **ON**, the server flushes (synchronizes) all changes to disk after each SQL statement. Normally, MySQL does a write of all changes to disk only after each SQL statement and lets the operating system handle the synchronizing to disk. See [Section B.3.3.3, “What to Do If MySQL Keeps Crashing”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#crashing). This variable is set to **ON** if you start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the [--flush](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_flush) option.
* **Note**
* If [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) is enabled, the value of [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) does not matter and changes to [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) have no effect on flush behavior.

* **[flush\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_flush_time)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--flush-time=#** |
| **System Variable** | [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |

* If this is set to a nonzero value, all tables are closed every [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) seconds to free up resources and synchronize unflushed data to disk. This option is best used only on systems with minimal resources.
* **Note**
* If [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) is enabled, the value of [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) does not matter and changes to [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) have no effect on flush behavior.

* **[foreign\_key\_checks](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_foreign_key_checks)**

|  |  |
| --- | --- |
| **System Variable** | [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **ON** |

* If set to 1 (the default), foreign key constraints are checked. If set to 0, foreign key constraints are ignored, with a couple of exceptions. When re-creating a table that was dropped, an error is returned if the table definition does not conform to the foreign key constraints referencing the table. Likewise, an [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) operation returns an error if a foreign key definition is incorrectly formed. For more information, see [Section 13.1.20.5, “FOREIGN KEY Constraints”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table-foreign-keys).
* Setting this variable has the same effect on [**NDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html) tables as it does for **InnoDB** tables. Typically you leave this setting enabled during normal operation, to enforce [referential integrity](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_referential_integrity). Disabling foreign key checking can be useful for reloading **InnoDB** tables in an order different from that required by their parent/child relationships. See [Section 13.1.20.5, “FOREIGN KEY Constraints”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table-foreign-keys).
* Setting **foreign\_key\_checks** to 0 also affects data definition statements: [**DROP SCHEMA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-database) drops a schema even if it contains tables that have foreign keys that are referred to by tables outside the schema, and [**DROP TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-table) drops tables that have foreign keys that are referred to by other tables.
* **Note**
* Setting **foreign\_key\_checks** to 1 does not trigger a scan of the existing table data. Therefore, rows added to the table while [**foreign\_key\_checks = 0**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks) are not verified for consistency.
* Dropping an index required by a foreign key constraint is not permitted, even with [**foreign\_key\_checks=0**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks). The foreign key constraint must be removed before dropping the index.

* **[ft\_boolean\_syntax](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ft_boolean_syntax)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ft-boolean-syntax=name** |
| **System Variable** | [**ft\_boolean\_syntax**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_boolean_syntax) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **+ -><()~\*:""&|** |

* The list of operators supported by boolean full-text searches performed using **IN BOOLEAN MODE**. See [Section 12.10.2, “Boolean Full-Text Searches”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#fulltext-boolean).
* The default variable value is **'+ -><()~\*:""&|'**. The rules for changing the value are as follows:
  + Operator function is determined by position within the string.
  + The replacement value must be 14 characters.
  + Each character must be an ASCII nonalphanumeric character.
  + Either the first or second character must be a space.
  + No duplicates are permitted except the phrase quoting operators in positions 11 and 12. These two characters are not required to be the same, but they are the only two that may be.
  + Positions 10, 13, and 14 (which by default are set to **:**, **&**, and **|**) are reserved for future extensions.

* **[ft\_max\_word\_len](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ft_max_word_len)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ft-max-word-len=#** |
| **System Variable** | [**ft\_max\_word\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_max_word_len) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Minimum Value** | **10** |

* The maximum length of the word to be included in a **MyISAM** **FULLTEXT** index.
* **Note**
* **FULLTEXT** indexes on **MyISAM** tables must be rebuilt after changing this variable. Use **REPAIR TABLE *tbl\_name* QUICK**.

* **[ft\_min\_word\_len](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ft_min_word_len)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ft-min-word-len=#** |
| **System Variable** | [**ft\_min\_word\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_min_word_len) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **4** |
| **Minimum Value** | **1** |

* The minimum length of the word to be included in a **MyISAM** **FULLTEXT** index.
* **Note**
* **FULLTEXT** indexes on **MyISAM** tables must be rebuilt after changing this variable. Use **REPAIR TABLE *tbl\_name* QUICK**.

* **[ft\_query\_expansion\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ft_query_expansion_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ft-query-expansion-limit=#** |
| **System Variable** | [**ft\_query\_expansion\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_query_expansion_limit) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **20** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1000** |

* The number of top matches to use for full-text searches performed using **WITH QUERY EXPANSION**.

* **[ft\_stopword\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ft_stopword_file)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ft-stopword-file=file\_name** |
| **System Variable** | [**ft\_stopword\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_stopword_file) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |

* The file from which to read the list of stopwords for full-text searches on **MyISAM** tables. The server looks for the file in the data directory unless an absolute path name is given to specify a different directory. All the words from the file are used; comments are not honored. By default, a built-in list of stopwords is used (as defined in the storage/myisam/ft\_static.c file). Setting this variable to the empty string (**''**) disables stopword filtering. See also [Section 12.10.4, “Full-Text Stopwords”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#fulltext-stopwords).
* **Note**
* **FULLTEXT** indexes on **MyISAM** tables must be rebuilt after changing this variable or the contents of the stopword file. Use **REPAIR TABLE *tbl\_name* QUICK**.

* **[general\_log](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_general_log)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--general-log[={OFF|ON}]** |
| **System Variable** | [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the general query log is enabled. The value can be 0 (or **OFF**) to disable the log or 1 (or **ON**) to enable the log. The destination for log output is controlled by the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable; if that value is **NONE**, no log entries are written even if the log is enabled.

* **[general\_log\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_general_log_file)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--general-log-file=file\_name** |
| **System Variable** | [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **host\_name.log** |

* The name of the general query log file. The default value is ***host\_name***.log, but the initial value can be changed with the [--general\_log\_file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) option.

* **[generated\_random\_password\_length](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_generated_random_password_length)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--generated-random-password-length=#** |
| **Introduced** | 8.0.18 |
| **System Variable** | [**generated\_random\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_generated_random_password_length) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **20** |
| **Minimum Value** | **5** |
| **Maximum Value** | **255** |

* The maximum number of characters permitted in random passwords generated for [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user), [**ALTER USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-user), and [**SET PASSWORD**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-password) statements. For more information, see [Random Password Generation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#random-password-generation).

* **[group\_concat\_max\_len](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_group_concat_max_len)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--group-concat-max-len=#** |
| **System Variable** | [**group\_concat\_max\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_group_concat_max_len) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **4** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* The maximum permitted result length in bytes for the [**GROUP\_CONCAT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_group-concat) function. The default is 1024.

* **[have\_compress](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_compress)**

**YES** if the **zlib** compression library is available to the server, **NO** if not. If not, the [**COMPRESS()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_compress) and [**UNCOMPRESS()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_uncompress) functions cannot be used.

* **[have\_dynamic\_loading](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_dynamic_loading)**

**YES** if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) supports dynamic loading of plugins, **NO** if not. If the value is **NO**, you cannot use options such as **--plugin-load** to load plugins at server startup, or the [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) statement to load plugins at runtime.

* **[have\_geometry](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_geometry)**

**YES** if the server supports spatial data types, **NO** if not.

* **[have\_openssl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_openssl)**

This variable is a synonym for [**have\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_ssl).

As of MySQL 8.0.26, [**have\_openssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_openssl) is deprecated and subject to removal in a future MySQL version. For information about TLS properties of MySQL connection interfaces, use the [**tls\_channel\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-tls-channel-status-table) table.

* **[have\_profiling](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_profiling)**

**YES** if statement profiling capability is present, **NO** if not. If present, the **profiling** system variable controls whether this capability is enabled or disabled. See [Section 13.7.7.31, “SHOW PROFILES Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-profiles).

This variable is deprecated and you should expect it to be removed in a future MySQL release.

* **[have\_query\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_query_cache)**

The query cache was removed in MySQL 8.0.3. [**have\_query\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_query_cache) is deprecated, always has a value of **NO**, and you should expect it to be removed in a future MySQL release.

* **[have\_rtree\_keys](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_rtree_keys)**

**YES** if **RTREE** indexes are available, **NO** if not. (These are used for spatial indexes in **MyISAM** tables.)

* **[have\_ssl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_ssl)**

|  |  |
| --- | --- |
| **Deprecated** | 8.0.26 |
| **System Variable** | [**have\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_ssl) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Valid Values** | **YES** (SSL support available)  **DISABLED** (SSL support was compiled into server, but server was not started with necessary options to enable it) |

* **YES** if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) supports SSL connections, **DISABLED** if the server was compiled with SSL support, but was not started with the appropriate connection-encryption options. For more information, see [Section 2.9.6, “Configuring SSL Library Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#source-ssl-library-configuration).
* As of MySQL 8.0.26, [**have\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_ssl) is deprecated and subject to removal in a future MySQL version. For information about TLS properties of MySQL connection interfaces, use the [**tls\_channel\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-tls-channel-status-table) table.

* **[have\_statement\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_statement_timeout)**

|  |  |
| --- | --- |
| **System Variable** | [**have\_statement\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_statement_timeout) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |

* Whether the statement execution timeout feature is available (see [Statement Execution Time Optimizer Hints](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-execution-time)). The value can be **NO** if the background thread used by this feature could not be initialized.

* **[have\_symlink](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_have_symlink)**

**YES** if symbolic link support is enabled, **NO** if not. This is required on Unix for support of the **DATA DIRECTORY** and **INDEX DIRECTORY** table options. If the server is started with the [--skip-symbolic-links](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_symbolic-links) option, the value is **DISABLED**.

This variable has no meaning on Windows.

**Note**

Symbolic link support, along with the [--symbolic-links](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_symbolic-links) option that controls it, is deprecated; expect these to be removed in a future version of MySQL. In addition, the option is disabled by default. The related [**have\_symlink**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_have_symlink) system variable also is deprecated and you should expect it to be removed in a future version of MySQL.

* **[histogram\_generation\_max\_mem\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_histogram_generation_max_mem_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--histogram-generation-max-mem-size=#** |
| **System Variable** | [**histogram\_generation\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_histogram_generation_max_mem_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **20000000** |
| **Minimum Value** | **1000000** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* The maximum amount of memory available for generating histogram statistics. See [Section 8.9.6, “Optimizer Statistics”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-statistics), and [Section 13.7.3.1, “ANALYZE TABLE Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table).
* Setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[host\_cache\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_host_cache_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--host-cache-size=#** |
| **System Variable** | [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **-1** (signifies autosizing; do not assign this literal value) |
| **Minimum Value** | **0** |
| **Maximum Value** | **65536** |

* The MySQL server maintains an in-memory host cache that contains client host name and IP address information and is used to avoid Domain Name System (DNS) lookups; see [Section 5.1.12.3, “DNS Lookups and the Host Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache).
* The [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) variable controls the size of the host cache, as well as the size of the Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table that exposes the cache contents. Setting [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) has these effects:
  + Setting the size to 0 disables the host cache. With the cache disabled, the server performs a DNS lookup every time a client connects.
  + Changing the size at runtime causes an implicit host cache flushing operation that clears the host cache, truncates the [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table, and unblocks any blocked hosts.

The default value is autosized to 128, plus 1 for a value of [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) up to 500, plus 1 for every increment of 20 over 500 in the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) value, capped to a limit of 2000.

Using the [--skip-host-cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) option is similar to setting the [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) system variable to 0, but [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) is more flexible because it can also be used to resize, enable, and disable the host cache at runtime, not just at server startup. Starting the server with [--skip-host-cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) does not prevent runtime changes to the value of [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size), but such changes have no effect and the cache is not re-enabled even if [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) is set larger than 0.

* **[hostname](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_hostname)**

|  |  |
| --- | --- |
| **System Variable** | [**hostname**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_hostname) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The server sets this variable to the server host name at startup. The maximum length is 255 characters as of MySQL 8.0.17, per RFC 1034, and 60 characters before that.

* **[identity](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_identity)**

This variable is a synonym for the [**last\_insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_last_insert_id) variable. It exists for compatibility with other database systems. You can read its value with **SELECT @@identity**, and set it using **SET identity**.

* **[init\_connect](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_init_connect)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--init-connect=name** |
| **System Variable** | [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* A string to be executed by the server for each client that connects. The string consists of one or more SQL statements, separated by semicolon characters.
* For users that have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege), the content of [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) is not executed. This is done so that an erroneous value for [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) does not prevent all clients from connecting. For example, the value might contain a statement that has a syntax error, thus causing client connections to fail. Not executing [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) for users that have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege enables them to open a connection and fix the [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) value.
* [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) execution is skipped for any client user with an expired password. This is done because such a user cannot execute arbitrary statements, and thus [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) execution fails, leaving the client unable to connect. Skipping [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) execution enables the user to connect and change password.
* The server discards any result sets produced by statements in the value of [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect).

* **[information\_schema\_stats\_expiry](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_information_schema_stats_expiry)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--information-schema-stats-expiry=#** |
| **System Variable** | [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **86400** |
| **Minimum Value** | **0** |
| **Maximum Value** | **31536000** |

* Some **INFORMATION\_SCHEMA** tables contain columns that provide table statistics:
* STATISTICS.CARDINALITY
* TABLES.AUTO\_INCREMENT
* TABLES.AVG\_ROW\_LENGTH
* TABLES.CHECKSUM
* TABLES.CHECK\_TIME
* TABLES.CREATE\_TIME
* TABLES.DATA\_FREE
* TABLES.DATA\_LENGTH
* TABLES.INDEX\_LENGTH
* TABLES.MAX\_DATA\_LENGTH
* TABLES.TABLE\_ROWS
* TABLES.UPDATE\_TIME
* Those columns represent dynamic table metadata; that is, information that changes as table contents change.
* By default, MySQL retrieves cached values for those columns from the **mysql.index\_stats** and **mysql.table\_stats** dictionary tables when the columns are queried, which is more efficient than retrieving statistics directly from the storage engine. If cached statistics are not available or have expired, MySQL retrieves the latest statistics from the storage engine and caches them in the **mysql.index\_stats** and **mysql.table\_stats** dictionary tables. Subsequent queries retrieve the cached statistics until the cached statistics expire.
* The [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) session variable defines the period of time before cached statistics expire. The default is 86400 seconds (24 hours), but the time period can be extended to as much as one year.
* To update cached values at any time for a given table, use [**ANALYZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table).
* To always retrieve the latest statistics directly from the storage engine and bypass cached values, set [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) to **0**.
* Querying statistics columns does not store or update statistics in the **mysql.index\_stats** and **mysql.table\_stats** dictionary tables under these circumstances:
  + When cached statistics have not expired.
  + When [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) is set to 0.
  + When the server is started in [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only), [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only), [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only), or [**innodb\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_only) mode.
  + When the query also fetches Performance Schema data.

The statistics cache may be updated during a multiple-statement transaction before it is known whether the transaction commits. As a result, the cache may contain information that does not correspond to a known committed state. This can occur with [**autocommit=0**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) or after [**START TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit).

[**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) is a session variable, and each client session can define its own expiration value. Statistics that are retrieved from the storage engine and cached by one session are available to other sessions.

For related information, see [Section 8.2.3, “Optimizing INFORMATION\_SCHEMA Queries”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#information-schema-optimization).

* **[init\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_init_file)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--init-file=file\_name** |
| **System Variable** | [**init\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_file) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |

* If specified, this variable names a file containing SQL statements to be read and executed during the startup process. Prior to MySQL 8.0.18, each statement must be on a single line and should not include comments. As of MySQL 8.0.18, the acceptable format for statements in the file is expanded to support these constructs:
  + **delimiter ;**, to set the statement delimiter to the **;** character.
  + **delimiter $$**, to set the statement delimiter to the **$$** character sequence.
  + Multiple statements on the same line, delimited by the current delimiter.
  + Multiple-line statements.
  + Comments from a **#** character to the end of the line.
  + Comments from a **--** sequence to the end of the line.
  + C-style comments from a **/\*** sequence to the following **\*/** sequence, including over multiple lines.
  + Multiple-line string literals enclosed within either single quote (**'**) or double quote (**"**) characters.

If the server is started with the [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize) or [--initialize-insecure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure) option, it operates in bootstap mode and some functionality is unavailable that limits the statements permitted in the file. These include statements that relate to account management (such as [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) or [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant)), replication, and global transaction identifiers. See [Section 17.1.3, “Replication with Global Transaction Identifiers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-gtids).

As of MySQL 8.0.17, threads created during server startup are used for tasks such as creating the data dictionary, running upgrade procedures, and creating system tables. To ensure a stable and predictable environment, these threads are executed with the server built-in defaults for some system variables, such as [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode), [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server), [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server), [**completion\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_completion_type), [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp), and [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption).

These threads are also used to execute the statements in any file specified with [**init\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_file) when starting the server, so such statements execute with the server's built-in default values for those system variables.

* **innodb\_*xxx***

[**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html) system variables are listed in [Section 15.14, “InnoDB Startup Options and System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-parameters). These variables control many aspects of storage, memory use, and I/O patterns for **InnoDB** tables, and are especially important now that **InnoDB** is the default storage engine.

* **[insert\_id](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_insert_id)**

The value to be used by the following [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) or [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) statement when inserting an **AUTO\_INCREMENT** value. This is mainly used with the binary log.

* **[interactive\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_interactive_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--interactive-timeout=#** |
| **System Variable** | [**interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_interactive_timeout) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **28800** |
| **Minimum Value** | **1** |

* The number of seconds the server waits for activity on an interactive connection before closing it. An interactive client is defined as a client that uses the **CLIENT\_INTERACTIVE** option to [**mysql\_real\_connect()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-real-connect.html). See also [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout).

* **[internal\_tmp\_disk\_storage\_engine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_internal_tmp_disk_storage_engine)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--internal-tmp-disk-storage-engine=#** |
| **Removed** | 8.0.16 |
| **System Variable** | [**internal\_tmp\_disk\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_disk_storage_engine) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **INNODB** |
| **Valid Values** | **MYISAM**  **INNODB** |

* **Important**
* In MySQL 8.0.16 and later, on-disk internal temporary tables always use the **InnoDB** storage engine; as of MySQL 8.0.16, this variable has been removed and is thus no longer supported.
* Prior to MySQL 8.0.16, this variable determines the storage engine used for on-disk internal temporary tables (see [Storage Engine for On-Disk Internal Temporary Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables-engines-disk)). Permitted values are **MYISAM** and **INNODB** (the default).

* **[internal\_tmp\_mem\_storage\_engine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_internal_tmp_mem_storage_engine)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--internal-tmp-mem-storage-engine=#** |
| **System Variable** | [**internal\_tmp\_mem\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_mem_storage_engine) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Enumeration |
| **Default Value** | **TempTable** |
| **Valid Values** | **TempTable**  **MEMORY** |

* The storage engine for in-memory internal temporary tables (see [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables)). Permitted values are **TempTable** (the default) and **MEMORY**.
* The [optimizer](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_optimizer) uses the storage engine defined by [**internal\_tmp\_mem\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_mem_storage_engine) for in-memory internal temporary tables.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[join\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_join_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--join-buffer-size=#** |
| **System Variable** | [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **262144** |
| **Minimum Value** | **128** |
| **Maximum Value (Windows)** | **4294967295** |
| **Maximum Value (Other, 64-bit platforms)** | **18446744073709547520** |
| **Maximum Value (Other, 32-bit platforms)** | **4294967295** |
| **Block Size** | **128** |

* The minimum size of the buffer that is used for plain index scans, range index scans, and joins that do not use indexes and thus perform full table scans. Normally, the best way to get fast joins is to add indexes. Increase the value of [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) to get a faster full join when adding indexes is not possible. One join buffer is allocated for each full join between two tables. For a complex join between several tables for which indexes are not used, multiple join buffers might be necessary.
* Unless a Block Nested-Loop or Batched Key Access algorithm is used, there is no gain from setting the buffer larger than required to hold each matching row, and all joins allocate at least the minimum size, so use caution in setting this variable to a large value globally. It is better to keep the global setting small and change the session setting to a larger value only in sessions that are doing large joins, or change the setting on a per-query basis by using a **SET\_VAR** optimizer hint (see [Section 8.9.3, “Optimizer Hints”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints)). Memory allocation time can cause substantial performance drops if the global size is larger than needed by most queries that use it.
* When Block Nested-Loop is used, a larger join buffer can be beneficial up to the point where all required columns from all rows in the first table are stored in the join buffer. This depends on the query; the optimal size may be smaller than holding all rows from the first tables.
* When Batched Key Access is used, the value of [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) defines how large the batch of keys is in each request to the storage engine. The larger the buffer, the more sequential access is made to the right hand table of a join operation, which can significantly improve performance.
* The default is 256KB. The maximum permissible setting for [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) is 4GB−1. Larger values are permitted for 64-bit platforms (except 64-bit Windows, for which large values are truncated to 4GB−1 with a warning).
* For additional information about join buffering, see [Section 8.2.1.7, “Nested-Loop Join Algorithms”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#nested-loop-joins). For information about Batched Key Access, see [Section 8.2.1.12, “Block Nested-Loop and Batched Key Access Joins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#bnl-bka-optimization).

* **[keep\_files\_on\_create](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_keep_files_on_create)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--keep-files-on-create[={OFF|ON}]** |
| **System Variable** | [**keep\_files\_on\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_keep_files_on_create) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If a **MyISAM** table is created with no **DATA DIRECTORY** option, the .MYD file is created in the database directory. By default, if **MyISAM** finds an existing .MYD file in this case, it overwrites it. The same applies to .MYI files for tables created with no **INDEX DIRECTORY** option. To suppress this behavior, set the [**keep\_files\_on\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_keep_files_on_create) variable to **ON** (1), in which case **MyISAM** does not overwrite existing files and returns an error instead. The default value is **OFF** (0).
* If a **MyISAM** table is created with a **DATA DIRECTORY** or **INDEX DIRECTORY** option and an existing .MYD or .MYI file is found, MyISAM always returns an error. It does not overwrite a file in the specified directory.

* **[key\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_key_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--key-buffer-size=#** |
| **System Variable** | [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8388608** |
| **Minimum Value** | **8** |
| **Maximum Value (64-bit platforms)** | **OS\_PER\_PROCESS\_LIMIT** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* Index blocks for **MyISAM** tables are buffered and are shared by all threads. [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) is the size of the buffer used for index blocks. The key buffer is also known as the key cache.
* The maximum permissible setting for [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) is 4GB−1 on 32-bit platforms. Larger values are permitted for 64-bit platforms. The effective maximum size might be less, depending on your available physical RAM and per-process RAM limits imposed by your operating system or hardware platform. The value of this variable indicates the amount of memory requested. Internally, the server allocates as much memory as possible up to this amount, but the actual allocation might be less.
* You can increase the value to get better index handling for all reads and multiple writes; on a system whose primary function is to run MySQL using the [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) storage engine, 25% of the machine's total memory is an acceptable value for this variable. However, you should be aware that, if you make the value too large (for example, more than 50% of the machine's total memory), your system might start to page and become extremely slow. This is because MySQL relies on the operating system to perform file system caching for data reads, so you must leave some room for the file system cache. You should also consider the memory requirements of any other storage engines that you may be using in addition to [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine).
* For even more speed when writing many rows at the same time, use [**LOCK TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#lock-tables). See [Section 8.2.5.1, “Optimizing INSERT Statements”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#insert-optimization).
* You can check the performance of the key buffer by issuing a [**SHOW STATUS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-status) statement and examining the [**Key\_read\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_read_requests), [**Key\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_reads), [**Key\_write\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_write_requests), and [**Key\_writes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_writes) status variables. (See [Section 13.7.7, “SHOW Statements”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show).) The **Key\_reads/Key\_read\_requests** ratio should normally be less than 0.01. The **Key\_writes/Key\_write\_requests** ratio is usually near 1 if you are using mostly updates and deletes, but might be much smaller if you tend to do updates that affect many rows at the same time or if you are using the **DELAY\_KEY\_WRITE** table option.
* The fraction of the key buffer in use can be determined using [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) in conjunction with the [**Key\_blocks\_unused**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_blocks_unused) status variable and the buffer block size, which is available from the [**key\_cache\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_block_size) system variable:
* 1 - ((Key\_blocks\_unused \* key\_cache\_block\_size) / key\_buffer\_size)
* This value is an approximation because some space in the key buffer is allocated internally for administrative structures. Factors that influence the amount of overhead for these structures include block size and pointer size. As block size increases, the percentage of the key buffer lost to overhead tends to decrease. Larger blocks results in a smaller number of read operations (because more keys are obtained per read), but conversely an increase in reads of keys that are not examined (if not all keys in a block are relevant to a query).
* It is possible to create multiple **MyISAM** key caches. The size limit of 4GB applies to each cache individually, not as a group. See [Section 8.10.2, “The MyISAM Key Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#myisam-key-cache).

* **[key\_cache\_age\_threshold](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_key_cache_age_threshold)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--key-cache-age-threshold=#** |
| **System Variable** | [**key\_cache\_age\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_age_threshold) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **300** |
| **Minimum Value** | **100** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |
| **Block Size** | **100** |

* This value controls the demotion of buffers from the hot sublist of a key cache to the warm sublist. Lower values cause demotion to happen more quickly. The minimum value is 100. The default value is 300. See [Section 8.10.2, “The MyISAM Key Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#myisam-key-cache).

* **[key\_cache\_block\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_key_cache_block_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--key-cache-block-size=#** |
| **System Variable** | [**key\_cache\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_block_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **512** |
| **Maximum Value** | **16384** |
| **Block Size** | **512** |

* The size in bytes of blocks in the key cache. The default value is 1024. See [Section 8.10.2, “The MyISAM Key Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#myisam-key-cache).

* **[key\_cache\_division\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_key_cache_division_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--key-cache-division-limit=#** |
| **System Variable** | [**key\_cache\_division\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_division_limit) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **100** |
| **Minimum Value** | **1** |
| **Maximum Value** | **100** |

* The division point between the hot and warm sublists of the key cache buffer list. The value is the percentage of the buffer list to use for the warm sublist. Permissible values range from 1 to 100. The default value is 100. See [Section 8.10.2, “The MyISAM Key Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#myisam-key-cache).

* **[large\_files\_support](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_large_files_support)**

|  |  |
| --- | --- |
| **System Variable** | [**large\_files\_support**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_files_support) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |

* Whether [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) was compiled with options for large file support.

* **[large\_pages](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_large_pages)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--large-pages[={OFF|ON}]** |
| **System Variable** | [**large\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_pages) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Platform Specific** | Linux |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether large page support is enabled (via the [--large-pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_large-pages) option). See [Section 8.12.3.2, “Enabling Large Page Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#large-page-support).

* **[large\_page\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_large_page_size)**

|  |  |
| --- | --- |
| **System Variable** | [**large\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_large_page_size) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |

* If large page support is enabled, this shows the size of memory pages. Large memory pages are supported only on Linux; on other platforms, the value of this variable is always 0. See [Section 8.12.3.2, “Enabling Large Page Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#large-page-support).

* **[last\_insert\_id](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_last_insert_id)**

The value to be returned from [**LAST\_INSERT\_ID()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_last-insert-id). This is stored in the binary log when you use [**LAST\_INSERT\_ID()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_last-insert-id) in a statement that updates a table. Setting this variable does not update the value returned by the [**mysql\_insert\_id()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-insert-id.html) C API function.

* **[lc\_messages](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lc_messages)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lc-messages=name** |
| **System Variable** | [**lc\_messages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **en\_US** |

* The locale to use for error messages. The default is **en\_US**. The server converts the argument to a language name and combines it with the value of [**lc\_messages\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages_dir) to produce the location for the error message file. See [Section 10.12, “Setting the Error Message Language”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#error-message-language).

* **[lc\_messages\_dir](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lc_messages_dir)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lc-messages-dir=dir\_name** |
| **System Variable** | [**lc\_messages\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages_dir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The directory where error messages are located. The server uses the value together with the value of [**lc\_messages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages) to produce the location for the error message file. See [Section 10.12, “Setting the Error Message Language”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#error-message-language).

* **[lc\_time\_names](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lc_time_names)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lc-time-names=value** |
| **System Variable** | [**lc\_time\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_time_names) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* This variable specifies the locale that controls the language used to display day and month names and abbreviations. This variable affects the output from the [**DATE\_FORMAT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_date-format), [**DAYNAME()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_dayname) and [**MONTHNAME()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_monthname) functions. Locale names are POSIX-style values such as **'ja\_JP'** or **'pt\_BR'**. The default value is **'en\_US'** regardless of your system's locale setting. For further information, see [Section 10.16, “MySQL Server Locale Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#locale-support).

* **[license](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_license)**

|  |  |
| --- | --- |
| **System Variable** | [**license**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_license) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **GPL** |

* The type of license the server has.

* **[local\_infile](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_local_infile)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--local-infile[={OFF|ON}]** |
| **System Variable** | [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable controls server-side **LOCAL** capability for [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) statements. Depending on the [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) setting, the server refuses or permits local data loading by clients that have **LOCAL** enabled on the client side.
* To explicitly cause the server to refuse or permit [**LOAD DATA LOCAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) statements (regardless of how client programs and libraries are configured at build time or runtime), start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) disabled or enabled, respectively. [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) can also be set at runtime. For more information, see [Section 6.1.6, “Security Considerations for LOAD DATA LOCAL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#load-data-local-security).

* **[lock\_wait\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_wait_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-wait-timeout=#** |
| **System Variable** | [**lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_wait_timeout) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **31536000** |
| **Minimum Value** | **1** |
| **Maximum Value** | **31536000** |

* This variable specifies the timeout in seconds for attempts to acquire metadata locks. The permissible values range from 1 to 31536000 (1 year). The default is 31536000.
* This timeout applies to all statements that use metadata locks. These include DML and DDL operations on tables, views, stored procedures, and stored functions, as well as [**LOCK TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#lock-tables), [**FLUSH TABLES WITH READ LOCK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables-with-read-lock), and [**HANDLER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#handler) statements.
* This timeout does not apply to implicit accesses to system tables in the **mysql** database, such as grant tables modified by [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant) or [**REVOKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#revoke) statements or table logging statements. The timeout does apply to system tables accessed directly, such as with [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) or [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update).
* The timeout value applies separately for each metadata lock attempt. A given statement can require more than one lock, so it is possible for the statement to block for longer than the [**lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_wait_timeout) value before reporting a timeout error. When lock timeout occurs, [**ER\_LOCK\_WAIT\_TIMEOUT**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_lock_wait_timeout) is reported.
* [**lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_wait_timeout) also defines the amount of time that a [**LOCK INSTANCE FOR BACKUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#lock-instance-for-backup) statement waits for a lock before giving up.

* **[locked\_in\_memory](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_locked_in_memory)**

|  |  |
| --- | --- |
| **System Variable** | [**locked\_in\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_locked_in_memory) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) was locked in memory with [--memlock](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_memlock).

* **[log\_error](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_error)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-error[=file\_name]** |
| **System Variable** | [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |

* The default error log destination. If the destination is the console, the value is **stderr**. Otherwise, the destination is a file and the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) value is the file name. See [Section 5.4.2, “The Error Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log).

* **[log\_error\_services](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_error_services)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-error-services=value** |
| **System Variable** | [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **log\_filter\_internal; log\_sink\_internal** |

* The components to enable for error logging. The variable may contain a list with 0, 1, or many elements. In the latter case, elements may be delimited by semicolon or (as of MySQL 8.0.12) comma, optionally followed by space. A given setting cannot use both semicolon and comma separators. Component order is significant because the server executes components in the order listed. Any loadable (not built in) component named in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value must first be installed with [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component). For more information, see [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration).

* **[log\_error\_suppression\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_error_suppression_list)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-error-suppression-list=value** |
| **Introduced** | 8.0.13 |
| **System Variable** | [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **empty string** |

* The [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) system variable applies to events intended for the error log and specifies which events to suppress when they occur with a priority of **WARNING** or **INFORMATION**. For example, if a particular type of warning is considered undesirable “noise” in the error log because it occurs frequently but is not of interest, it can be suppressed. This variable affects filtering performed by the **log\_filter\_internal** error log filter component, which is enabled by default (see [Section 5.5.3, “Error Log Components”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-components)). If **log\_filter\_internal** is disabled, [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) has no effect.
* The [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) value may be the empty string for no suppression, or a list of one or more comma-separated values indicating the error codes to suppress. Error codes may be specified in symbolic or numeric form. A numeric code may be specified with or without the **MY-** prefix. Leading zeros in the numeric part are not significant. Examples of permitted code formats:
* ER\_SERVER\_SHUTDOWN\_COMPLETE
* MY-000031
* 000031
* MY-31
* 31
* Symbolic values are preferable to numeric values for readability and portability. For information about the permitted error symbols and numbers, see [MySQL 8.0 Error Message Reference](https://dev.mysql.com/doc/mysql-errors/8.0/en/).
* The effect of [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) combines with that of [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity). For additional information, see [Section 5.4.2.5, “Priority-Based Error Log Filtering (log\_filter\_internal)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-priority-based-filtering).

* **[log\_error\_verbosity](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_error_verbosity)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-error-verbosity=#** |
| **System Variable** | [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **2** |
| **Minimum Value** | **1** |
| **Maximum Value** | **3** |

* The [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) system variable specifies the verbosity for handling events intended for the error log. This variable affects filtering performed by the **log\_filter\_internal** error log filter component, which is enabled by default (see [Section 5.5.3, “Error Log Components”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-components)). If **log\_filter\_internal** is disabled, [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) has no effect.
* Events intended for the error log have a priority of **ERROR**, **WARNING**, or **INFORMATION**. [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) controls verbosity based on which priorities to permit for messages written to the log, as shown in the following table.

| **log\_error\_verbosity Value** | **Permitted Message Priorities** |
| --- | --- |
| 1 | **ERROR** |
| 2 | **ERROR**, **WARNING** |
| 3 | **ERROR**, **WARNING**, **INFORMATION** |

* There is also a priority of **SYSTEM**. System messages about non-error situations are printed to the error log regardless of the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value. These messages include startup and shutdown messages, and some significant changes to settings.
* The effect of [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) combines with that of [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list). For additional information, see [Section 5.4.2.5, “Priority-Based Error Log Filtering (log\_filter\_internal)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-priority-based-filtering).

* **[log\_output](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_output)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-output=name** |
| **System Variable** | [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Set |
| **Default Value** | **FILE** |
| **Valid Values** | **TABLE**  **FILE**  **NONE** |

* The destination or destinations for general query log and slow query log output. The value is a list one or more comma-separated words chosen from **TABLE**, **FILE**, and **NONE**. **TABLE** selects logging to the [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) and **slow\_log** tables in the **mysql** system schema. **FILE** selects logging to log files. **NONE** disables logging. If **NONE** is present in the value, it takes precedence over any other words that are present. **TABLE** and **FILE** can both be given to select both log output destinations.
* This variable selects log output destinations, but does not enable log output. To do that, enable the [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) and [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) system variables. For **FILE** logging, the [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) and [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) system variables determine the log file locations. For more information, see [Section 5.4.1, “Selecting General Query Log and Slow Query Log Output Destinations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations).

* **[log\_queries\_not\_using\_indexes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_queries_not_using_indexes)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-queries-not-using-indexes[={OFF|ON}]** |
| **System Variable** | [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If you enable this variable with the slow query log enabled, queries that are expected to retrieve all rows are logged. See [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log). This option does not necessarily mean that no index is used. For example, a query that uses a full index scan uses an index but would be logged because the index would not limit the number of rows.

* **[log\_raw](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_raw)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-raw[={OFF|ON}]** |
| **System Variable (≥ 8.0.19)** | [**log\_raw**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_raw) |
| **Scope (≥ 8.0.19)** | Global |
| **Dynamic (≥ 8.0.19)** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies (≥ 8.0.19)** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* The [**log\_raw**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_raw) system variable is initially set to the value of the [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) option. See the description of that option for more information. The system variable may also be set at runtime to change password masking behavior.

* **[log\_slow\_admin\_statements](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_slow_admin_statements)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-slow-admin-statements[={OFF|ON}]** |
| **System Variable** | [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Include slow administrative statements in the statements written to the slow query log. Administrative statements include [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), [**ANALYZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table), [**CHECK TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#check-table), [**CREATE INDEX**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-index), [**DROP INDEX**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-index), [**OPTIMIZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#optimize-table), and [**REPAIR TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#repair-table).

* **[log\_slow\_extra](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_slow_extra)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-slow-extra[={OFF|ON}]** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**log\_slow\_extra**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_extra) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If the slow query log is enabled and the output destination includes **FILE**, the server writes additional fields to log file lines that provide information about slow statements. See [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log). **TABLE** output is unaffected.

* **[log\_syslog](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_syslog)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-syslog[={OFF|ON}]** |
| **Deprecated** | Yes (removed in 8.0.13) |
| **System Variable** | [**log\_syslog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** (when error logging to system log is enabled) |

* Prior to MySQL 8.0, this variable controlled whether to perform error logging to the system log (the Event Log on Windows, and **syslog** on Unix and Unix-like systems).
* In MySQL 8.0, the **log\_sink\_syseventlog** log component implements error logging to the system log (see [Section 5.4.2.8, “Error Logging to the System Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog)), so this type of logging can be enabled by adding that component to the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) system variable. [**log\_syslog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog) is removed. (Prior to MySQL 8.0.13, [**log\_syslog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog) exists but is deprecated and has no effect.)

* **[log\_syslog\_facility](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_syslog_facility)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-syslog-facility=value** |
| **Removed** | 8.0.13 |
| **System Variable** | [**log\_syslog\_facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_facility) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **daemon** |

* This variable was removed in MySQL 8.0.13 and replaced by [**syseventlog.facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.facility).

* **[log\_syslog\_include\_pid](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_syslog_include_pid)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-syslog-include-pid[={OFF|ON}]** |
| **Removed** | 8.0.13 |
| **System Variable** | [**log\_syslog\_include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_include_pid) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* This variable was removed in MySQL 8.0.13 and replaced by [**syseventlog.include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.include_pid).

* **[log\_syslog\_tag](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_syslog_tag)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-syslog-tag=tag** |
| **Removed** | 8.0.13 |
| **System Variable** | [**log\_syslog\_tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_tag) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **empty string** |

* This variable was removed in MySQL 8.0.13 and replaced by [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag).

* **[log\_timestamps](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_timestamps)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-timestamps=#** |
| **System Variable** | [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **UTC** |
| **Valid Values** | **UTC**  **SYSTEM** |

* This variable controls the time zone of timestamps in messages written to the error log, and in general query log and slow query log messages written to files. It does not affect the time zone of general query log and slow query log messages written to tables (**mysql.general\_log**, **mysql.slow\_log**). Rows retrieved from those tables can be converted from the local system time zone to any desired time zone with [**CONVERT\_TZ()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_convert-tz) or by setting the session [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) system variable.
* Permitted [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) values are **UTC** (the default) and **SYSTEM** (the local system time zone).
* Timestamps are written using ISO 8601 / RFC 3339 format: ***YYYY-MM-DD*T*hh:mm:ss.uuuuuu*** plus a tail value of **Z** signifying Zulu time (UTC) or **±hh:mm** (an offset from UTC).

* **[log\_throttle\_queries\_not\_using\_indexes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_log_throttle_queries_not_using_indexes)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--log-throttle-queries-not-using-indexes=#** |
| **System Variable** | [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |

* If [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) is enabled, the [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) variable limits the number of such queries per minute that can be written to the slow query log. A value of 0 (the default) means “no limit”. For more information, see [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log).

* **[long\_query\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_long_query_time)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--long-query-time=#** |
| **System Variable** | [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Numeric |
| **Default Value** | **10** |
| **Minimum Value** | **0** |

* If a query takes longer than this many seconds, the server increments the [**Slow\_queries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slow_queries) status variable. If the slow query log is enabled, the query is logged to the slow query log file. This value is measured in real time, not CPU time, so a query that is under the threshold on a lightly loaded system might be above the threshold on a heavily loaded one. The minimum and default values of [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) are 0 and 10, respectively. The value can be specified to a resolution of microseconds. See [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log).
* Smaller values of this variable result in more statements being considered long-running, with the result that more space is required for the slow query log. For very small values (less than one second), the log may grow quite large in a small time. Increasing the number of statements considered long-running may also result in false positives for the “excessive Number of Long Running Processes” alert in MySQL Enterprise Monitor, especially if Group Replication is enabled. For these reasons, very small values should be used in test environments only, or, in production environments, only for a short period.

* **[low\_priority\_updates](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_low_priority_updates)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--low-priority-updates[={OFF|ON}]** |
| **System Variable** | [**low\_priority\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_low_priority_updates) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If set to **1**, all [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update), [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete), and **LOCK TABLE WRITE** statements wait until there is no pending [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) or **LOCK TABLE READ** on the affected table. The same effect can be obtained using **{INSERT | REPLACE | DELETE | UPDATE} LOW\_PRIORITY ...** to lower the priority of only one query. This variable affects only storage engines that use only table-level locking (such as **MyISAM**, **MEMORY**, and **MERGE**). See [Section 8.11.2, “Table Locking Issues”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#table-locking).
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[lower\_case\_file\_system](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lower_case_file_system)**

|  |  |
| --- | --- |
| **System Variable** | [**lower\_case\_file\_system**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_file_system) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |

* This variable describes the case sensitivity of file names on the file system where the data directory is located. **OFF** means file names are case-sensitive, **ON** means they are not case-sensitive. This variable is read only because it reflects a file system attribute and setting it would have no effect on the file system.

* **[lower\_case\_table\_names](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lower_case_table_names)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lower-case-table-names[=#]** |
| **System Variable** | [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **2** |

* If set to 0, table names are stored as specified and comparisons are case-sensitive. If set to 1, table names are stored in lowercase on disk and comparisons are not case-sensitive. If set to 2, table names are stored as given but compared in lowercase. This option also applies to database names and table aliases. For additional details, see [Section 9.2.3, “Identifier Case Sensitivity”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\language-structure.html#identifier-case-sensitivity).
* On Windows the default value is 1. On macOS, the default value is 2. On Linux, a value of 2 is not supported; the server forces the value to 0 instead.
* You should not set [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) to 0 if you are running MySQL on a system where the data directory resides on a case-insensitive file system (such as on Windows or macOS). It is an unsupported combination that could result in a hang condition when running an **INSERT INTO ... SELECT ... FROM *tbl\_name*** operation with the wrong ***tbl\_name*** lettercase. With **MyISAM**, accessing table names using different lettercases could cause index corruption.
* An error message is printed and the server exits if you attempt to start the server with [**--lower\_case\_table\_names=0**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) on a case-insensitive file system.
* If you are using **InnoDB** tables, you should set this variable to 1 on all platforms to force names to be converted to lowercase.
* The setting of this variable affects the behavior of replication filtering options with regard to case sensitivity. For more information, see [Section 17.2.5, “How Servers Evaluate Replication Filtering Rules”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-rules).
* It is prohibited to start the server with a [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) setting that is different from the setting used when the server was initialized. The restriction is necessary because collations used by various data dictionary table fields are determined by the setting defined when the server is initialized, and restarting the server with a different setting would introduce inconsistencies with respect to how identifiers are ordered and compared.
* It is therefore necessary to configure [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) to the desired setting before initializing the server. In most cases, this requires configuring [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) in a MySQL option file before starting the MySQL server for the first time. For APT installations on Debian and Ubuntu, however, the server is initialized for you, and there is no opportunity to configure the setting in an option file beforehand. You must therefore use the **debconf-set-selection** utility prior to installing MySQL using APT to enable [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names). To do so, run this command before installing MySQL using APT:
* shell> sudo debconf-set-selections <<< "mysql-server mysql-server/lowercase-table-names select Enabled
* **Note**
* The ability to enable [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) using **debconf-set-selections** was added in MySQL 8.0.17. Enabling [**lower\_case\_table\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lower_case_table_names) sets the value to 1.

* **[mandatory\_roles](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_mandatory_roles)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--mandatory-roles=value** |
| **System Variable** | [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **empty string** |

* Roles the server should treat as mandatory. In effect, these roles are automatically granted to every user, although setting [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) does not actually change any user accounts, and the granted roles are not visible in the **mysql.role\_edges** system table.
* The variable value is a comma-separated list of role names. Example:
* SET PERSIST mandatory\_roles = '`role1`@`%`,`role2`,role3,role4@localhost';
* Setting the runtime value of [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) requires the [**ROLE\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_role-admin) privilege, in addition to the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege) normally required to set a global system variable runtime value.
* Role names consist of a user part and host part in ***user\_name*@*host\_name*** format. The host part, if omitted, defaults to **%**. For additional information, see [Section 6.2.5, “Specifying Role Names”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#role-names).
* The [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) value is a string, so user names and host names, if quoted, must be written in a fashion permitted for quoting within quoted strings.
* Roles named in the value of [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) cannot be revoked with [**REVOKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#revoke) or dropped with [**DROP ROLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-role) or [**DROP USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-user).
* To prevent sessions from being made system sessions by default, a role that has the [**SYSTEM\_USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-user) privilege cannot be listed in the value of the [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) system variable:
  + If [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) is assigned a role at startup that has the [**SYSTEM\_USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-user) privilege, the server writes a message to the error log and exits.
  + If [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) is assigned a role at runtime that has the [**SYSTEM\_USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-user) privilege, an error occurs and the [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) value remains unchanged.

Mandatory roles, like explicitly granted roles, do not take effect until activated (see [Activating Roles](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#roles-activating)). At login time, role activation occurs for all granted roles if the [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) system variable is enabled; otherwise, or for roles that are set as default roles otherwise. At runtime, [**SET ROLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-role) activates roles.

Roles that do not exist when assigned to [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) but are created later may require special treatment to be considered mandatory. For details, see [Defining Mandatory Roles](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#mandatory-roles).

[**SHOW GRANTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-grants) displays mandatory roles according to the rules described in [Section 13.7.7.21, “SHOW GRANTS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-grants).

* **[max\_allowed\_packet](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_allowed_packet)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-allowed-packet=#** |
| **System Variable** | [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **67108864** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **1073741824** |
| **Block Size** | **1024** |

* The maximum size of one packet or any generated/intermediate string, or any parameter sent by the [**mysql\_stmt\_send\_long\_data()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-stmt-send-long-data.html) C API function. The default is 64MB.
* The packet message buffer is initialized to [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) bytes, but can grow up to [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) bytes when needed. This value by default is small, to catch large (possibly incorrect) packets.
* You must increase this value if you are using large [**BLOB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#blob) columns or long strings. It should be as big as the largest [**BLOB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#blob) you want to use. The protocol limit for [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) is 1GB. The value should be a multiple of 1024; nonmultiples are rounded down to the nearest multiple.
* When you change the message buffer size by changing the value of the [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) variable, you should also change the buffer size on the client side if your client program permits it. The default [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) value built in to the client library is 1GB, but individual client programs might override this. For example, [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) and [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) have defaults of 16MB and 24MB, respectively. They also enable you to change the client-side value by setting [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) on the command line or in an option file.
* The session value of this variable is read only. The client can receive up to as many bytes as the session value. However, the server does not send to the client more bytes than the current global [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) value. (The global value could be less than the session value if the global value is changed after the client connects.)

* **[max\_connect\_errors](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_connect_errors)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-connect-errors=#** |
| **System Variable** | [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **100** |
| **Minimum Value** | **1** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* After [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) successive connection requests from a host are interrupted without a successful connection, the server blocks that host from further connections. If a connection from a host is established successfully within fewer than [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) attempts after a previous connection was interrupted, the error count for the host is cleared to zero. To unblock blocked hosts, flush the host cache; see [Flushing the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-flushing).

* **[max\_connections](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_connections)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-connections=#** |
| **System Variable** | [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **151** |
| **Minimum Value** | **1** |
| **Maximum Value** | **100000** |

* The maximum permitted number of simultaneous client connections. For more information, see [Section 5.1.12.1, “Connection Interfaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces).

* **[max\_delayed\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_delayed_threads)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-delayed-threads=#** |
| **Deprecated** | Yes |
| **System Variable** | [**max\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_delayed_threads) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **20** |
| **Minimum Value** | **0** |
| **Maximum Value** | **16384** |

* This system variable is deprecated (because **DELAYED** inserts are not supported) and subject to removal in a future MySQL release.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[max\_digest\_length](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_digest_length)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-digest-length=#** |
| **System Variable** | [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1048576** |

* The maximum number of bytes of memory reserved per session for computation of normalized statement digests. Once that amount of space is used during digest computation, truncation occurs: no further tokens from a parsed statement are collected or figure into its digest value. Statements that differ only after that many bytes of parsed tokens produce the same normalized statement digest and are considered identical if compared or if aggregated for digest statistics.
* **Warning**
* Setting [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length) to zero disables digest production, which also disables server functionality that requires digests, such as MySQL Enterprise Firewall.
* Decreasing the [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length) value reduces memory use but causes the digest value of more statements to become indistinguishable if they differ only at the end. Increasing the value permits longer statements to be distinguished but increases memory use, particularly for workloads that involve large numbers of simultaneous sessions (the server allocates [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length) bytes per session).
* The parser uses this system variable as a limit on the maximum length of normalized statement digests that it computes. The Performance Schema, if it tracks statement digests, makes a copy of the digest value, using the [**performance\_schema\_max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_length). system variable as a limit on the maximum length of digests that it stores. Consequently, if [**performance\_schema\_max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_length) is less than [**max\_digest\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_digest_length), digest values stored in the Performance Schema are truncated relative to the original digest values.
* For more information about statement digesting, see [Section 27.10, “Performance Schema Statement Digests and Sampling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-statement-digests).

* **[max\_error\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_error_count)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-error-count=#** |
| **System Variable** | [**max\_error\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_error_count) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **0** |
| **Maximum Value** | **65535** |

* The maximum number of error, warning, and information messages to be stored for display by the [**SHOW ERRORS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-errors) and [**SHOW WARNINGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings) statements. This is the same as the number of condition areas in the diagnostics area, and thus the number of conditions that can be inspected by [**GET DIAGNOSTICS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#get-diagnostics).
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[max\_execution\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_execution_time)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-execution-time=#** |
| **System Variable** | [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **0** |

* The execution timeout for [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements, in milliseconds. If the value is 0, timeouts are not enabled.
* [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) applies as follows:
  + The global [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) value provides the default for the session value for new connections. The session value applies to **SELECT** executions executed within the session that include no [**MAX\_EXECUTION\_TIME(*N*)**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-execution-time) optimizer hint or for which ***N*** is 0.
  + [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) applies to read-only [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements. Statements that are not read only are those that invoke a stored function that modifies data as a side effect.
  + [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) is ignored for [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements in stored programs.

* **[max\_heap\_table\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_heap_table_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-heap-table-size=#** |
| **System Variable** | [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **16777216** |
| **Minimum Value** | **16384** |
| **Maximum Value (64-bit platforms)** | **18446744073709547520** |
| **Maximum Value (32-bit platforms)** | **4294967295** |
| **Block Size** | **1024** |

* This variable sets the maximum size to which user-created **MEMORY** tables are permitted to grow. The value of the variable is used to calculate **MEMORY** table **MAX\_ROWS** values. Setting this variable has no effect on any existing **MEMORY** table, unless the table is re-created with a statement such as [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) or altered with [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) or [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table). A server restart also sets the maximum size of existing **MEMORY** tables to the global [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size) value.
* This variable is also used in conjunction with [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) to limit the size of internal in-memory tables. See [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).
* **max\_heap\_table\_size** is not replicated. See [Section 17.5.1.21, “Replication and MEMORY Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-memory), and [Section 17.5.1.39, “Replication and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-variables), for more information.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[max\_insert\_delayed\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_insert_delayed_threads)**

|  |  |
| --- | --- |
| **Deprecated** | Yes |
| **System Variable** | [**max\_insert\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_insert_delayed_threads) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |

* This variable is a synonym for [**max\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_delayed_threads).
* This system variable is deprecated (because **DELAYED** inserts are not supported); expect it to be removed in a future release.

* **[max\_join\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_join_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-join-size=#** |
| **System Variable** | [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **18446744073709551615** |
| **Minimum Value** | **1** |
| **Maximum Value** | **18446744073709551615** |

* Do not permit statements that probably need to examine more than [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) rows (for single-table statements) or row combinations (for multiple-table statements) or that are likely to do more than [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) disk seeks. By setting this value, you can catch statements where keys are not used properly and that would probably take a long time. Set it if your users tend to perform joins that lack a **WHERE** clause, that take a long time, or that return millions of rows. For more information, see [Using Safe-Updates Mode (--safe-updates)](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#safe-updates).
* Setting this variable to a value other than **DEFAULT** resets the value of [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) to **0**. If you set the [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) value again, the [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) variable is ignored.

* **[max\_length\_for\_sort\_data](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_length_for_sort_data)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-length-for-sort-data=#** |
| **Deprecated** | 8.0.20 |
| **System Variable** | [**max\_length\_for\_sort\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_length_for_sort_data) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **4096** |
| **Minimum Value** | **4** |
| **Maximum Value** | **8388608** |

* This variable is deprecated as of MySQL 8.0.20 due to optimizer changes that make it obsolete and of no effect. Previously, it acted as the cutoff on the size of index values that determines which **filesort** algorithm to use. See [Section 8.2.1.16, “ORDER BY Optimization”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#order-by-optimization).

* **[max\_points\_in\_geometry](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_points_in_geometry)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-points-in-geometry=#** |
| **System Variable** | [**max\_points\_in\_geometry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_points_in_geometry) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **65536** |
| **Minimum Value** | **3** |
| **Maximum Value** | **1048576** |

* The maximum value of the ***points\_per\_circle*** argument to the [**ST\_Buffer\_Strategy()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_st-buffer-strategy) function.

* **[max\_prepared\_stmt\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_prepared_stmt_count)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-prepared-stmt-count=#** |
| **System Variable** | [**max\_prepared\_stmt\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_prepared_stmt_count) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **16382** |
| **Minimum Value** | **0** |
| **Maximum Value (≥ 8.0.18)** | **4194304** |
| **Maximum Value (≤ 8.0.17)** | **1048576** |

* This variable limits the total number of prepared statements in the server. It can be used in environments where there is the potential for denial-of-service attacks based on running the server out of memory by preparing huge numbers of statements. If the value is set lower than the current number of prepared statements, existing statements are not affected and can be used, but no new statements can be prepared until the current number drops below the limit. Setting the value to 0 disables prepared statements.

* **[max\_seeks\_for\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_seeks_for_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-seeks-for-key=#** |
| **System Variable** | [**max\_seeks\_for\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_seeks_for_key) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value (Windows)** | **4294967295** |
| **Default Value (Other, 64-bit platforms)** | **18446744073709551615** |
| **Default Value (Other, 32-bit platforms)** | **4294967295** |
| **Minimum Value** | **1** |
| **Maximum Value (Windows)** | **4294967295** |
| **Maximum Value (Other, 64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (Other, 32-bit platforms)** | **4294967295** |

* Limit the assumed maximum number of seeks when looking up rows based on a key. The MySQL optimizer assumes that no more than this number of key seeks are required when searching for matching rows in a table by scanning an index, regardless of the actual cardinality of the index (see [Section 13.7.7.22, “SHOW INDEX Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-index)). By setting this to a low value (say, 100), you can force MySQL to prefer indexes instead of table scans.

* **[max\_sort\_length](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_sort_length)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-sort-length=#** |
| **System Variable** | [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **4** |
| **Maximum Value** | **8388608** |

* The number of bytes to use when sorting data values. The server uses only the first [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) bytes of each value and ignores the rest. Consequently, values that differ only after the first [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) bytes compare as equal for **GROUP BY**, **ORDER BY**, and **DISTINCT** operations.
* Increasing the value of [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) may require increasing the value of [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) as well. For details, see [Section 8.2.1.16, “ORDER BY Optimization”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#order-by-optimization)

* **[max\_sp\_recursion\_depth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_sp_recursion_depth)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-sp-recursion-depth[=#]** |
| **System Variable** | [**max\_sp\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sp_recursion_depth) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Maximum Value** | **255** |

* The number of times that any given stored procedure may be called recursively. The default value for this option is 0, which completely disables recursion in stored procedures. The maximum value is 255.
* Stored procedure recursion increases the demand on thread stack space. If you increase the value of [**max\_sp\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sp_recursion_depth), it may be necessary to increase thread stack size by increasing the value of [**thread\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_stack) at server startup.

* **[max\_user\_connections](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_user_connections)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-user-connections=#** |
| **System Variable** | [**max\_user\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_user_connections) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4294967295** |

* The maximum number of simultaneous connections permitted to any given MySQL user account. A value of 0 (the default) means “no limit.”
* This variable has a global value that can be set at server startup or runtime. It also has a read-only session value that indicates the effective simultaneous-connection limit that applies to the account associated with the current session. The session value is initialized as follows:
  + If the user account has a nonzero **MAX\_USER\_CONNECTIONS** resource limit, the session [**max\_user\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_user_connections) value is set to that limit.
  + Otherwise, the session [**max\_user\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_user_connections) value is set to the global value.

Account resource limits are specified using the [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) or [**ALTER USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-user) statement. See [Section 6.2.20, “Setting Account Resource Limits”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#user-resources).

* **[max\_write\_lock\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_max_write_lock_count)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--max-write-lock-count=#** |
| **System Variable** | [**max\_write\_lock\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_write_lock_count) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value (Windows)** | **4294967295** |
| **Default Value (Other, 64-bit platforms)** | **18446744073709551615** |
| **Default Value (Other, 32-bit platforms)** | **4294967295** |
| **Minimum Value** | **1** |
| **Maximum Value (Windows)** | **4294967295** |
| **Maximum Value (Other, 64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (Other, 32-bit platforms)** | **4294967295** |

* After this many write locks, permit some pending read lock requests to be processed in between. Write lock requests have higher priority than read lock requests. However, if [**max\_write\_lock\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_write_lock_count) is set to some low value (say, 10), read lock requests may be preferred over pending write lock requests if the read lock requests have already been passed over in favor of 10 write lock requests. Normally this behavior does not occur because [**max\_write\_lock\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_write_lock_count) by default has a very large value.

* **[mecab\_rc\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_mecab_rc_file)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--mecab-rc-file=file\_name** |
| **System Variable** | [**mecab\_rc\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mecab_rc_file) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |

* The **mecab\_rc\_file** option is used when setting up the MeCab full-text parser.
* The **mecab\_rc\_file** option defines the path to the mecabrc configuration file, which is the configuration file for MeCab. The option is read-only and can only be set at startup. The mecabrc configuration file is required to initialize MeCab.
* For information about the MeCab full-text parser, see [Section 12.10.9, “MeCab Full-Text Parser Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#fulltext-search-mecab).
* For information about options that can be specified in the MeCab mecabrc configuration file, refer to the [MeCab Documentation](http://mecab.googlecode.com/svn/trunk/mecab/doc/index.html) on the [Google Developers](https://code.google.com/) site.

* **[metadata\_locks\_cache\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_metadata_locks_cache_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--metadata-locks-cache-size=#** |
| **Deprecated** | Yes (removed in 8.0.13) |
| **System Variable** | [**metadata\_locks\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_metadata_locks_cache_size) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1024** |
| **Minimum Value** | **1** |
| **Maximum Value** | **1048576** |

* This system variable was removed in MySQL 8.0.13.

* **[metadata\_locks\_hash\_instances](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_metadata_locks_hash_instances)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--metadata-locks-hash-instances=#** |
| **Deprecated** | Yes (removed in 8.0.13) |
| **System Variable** | [**metadata\_locks\_hash\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_metadata_locks_hash_instances) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8** |
| **Minimum Value** | **1** |
| **Maximum Value** | **1024** |

* This system variable was removed in MySQL 8.0.13.

* **[min\_examined\_row\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_min_examined_row_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--min-examined-row-limit=#** |
| **System Variable** | [**min\_examined\_row\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_min_examined_row_limit) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* Queries that examine fewer than this number of rows are not logged to the slow query log.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[myisam\_data\_pointer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_data_pointer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-data-pointer-size=#** |
| **System Variable** | [**myisam\_data\_pointer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_data_pointer_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **6** |
| **Minimum Value** | **2** |
| **Maximum Value** | **7** |

* The default pointer size in bytes, to be used by [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) for **MyISAM** tables when no **MAX\_ROWS** option is specified. This variable cannot be less than 2 or larger than 7. The default value is 6. See [Section B.3.2.10, “The table is full”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#full-table).

* **[myisam\_max\_sort\_file\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_max_sort_file_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-max-sort-file-size=#** |
| **System Variable** | [**myisam\_max\_sort\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_max_sort_file_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value (Windows)** | **2146435072** |
| **Default Value (Other, 64-bit platforms)** | **9223372036853727232** |
| **Default Value (Other, 32-bit platforms)** | **2147483648** |
| **Maximum Value (Windows)** | **2146435072** |
| **Maximum Value (Other, 64-bit platforms)** | **9223372036853727232** |
| **Maximum Value (Other, 32-bit platforms)** | **2147483648** |

* The maximum size of the temporary file that MySQL is permitted to use while re-creating a **MyISAM** index (during [**REPAIR TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#repair-table), [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), or [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data)). If the file size would be larger than this value, the index is created using the key cache instead, which is slower. The value is given in bytes.
* If **MyISAM** index files exceed this size and disk space is available, increasing the value may help performance. The space must be available in the file system containing the directory where the original index file is located.

* **[myisam\_mmap\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_mmap_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-mmap-size=#** |
| **System Variable** | [**myisam\_mmap\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_mmap_size) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value (64-bit platforms)** | **18446744073709551615** |
| **Default Value (32-bit platforms)** | **4294967295** |
| **Minimum Value** | **7** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* The maximum amount of memory to use for memory mapping compressed [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) files. If many compressed **MyISAM** tables are used, the value can be decreased to reduce the likelihood of memory-swapping problems.

* **[myisam\_recover\_options](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_recover_options)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-recover-options[=list]** |
| **System Variable** | [**myisam\_recover\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_recover_options) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF**  **DEFAULT**  **BACKUP**  **FORCE**  **QUICK** |

* Set the **MyISAM** storage engine recovery mode. The variable value is any combination of the values of **OFF**, **DEFAULT**, **BACKUP**, **FORCE**, or **QUICK**. If you specify multiple values, separate them by commas. Specifying the variable with no value at server startup is the same as specifying **DEFAULT**, and specifying with an explicit value of **""** disables recovery (same as a value of **OFF**). If recovery is enabled, each time [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) opens a **MyISAM** table, it checks whether the table is marked as crashed or was not closed properly. (The last option works only if you are running with external locking disabled.) If this is the case, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) runs a check on the table. If the table was corrupted, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) attempts to repair it.
* The following options affect how the repair works.

| **Option** | **Description** |
| --- | --- |
| **OFF** | No recovery. |
| **DEFAULT** | Recovery without backup, forcing, or quick checking. |
| **BACKUP** | If the data file was changed during recovery, save a backup of the ***tbl\_name***.MYD file as ***tbl\_name-datetime***.BAK. |
| **FORCE** | Run recovery even if we would lose more than one row from the .MYD file. |
| **QUICK** | Do not check the rows in the table if there are not any delete blocks. |

* Before the server automatically repairs a table, it writes a note about the repair to the error log. If you want to be able to recover from most problems without user intervention, you should use the options **BACKUP,FORCE**. This forces a repair of a table even if some rows would be deleted, but it keeps the old data file as a backup so that you can later examine what happened.
* See [Section 16.2.1, “MyISAM Startup Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-start).

* **[myisam\_repair\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_repair_threads)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-repair-threads=#** |
| **System Variable** | [**myisam\_repair\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_repair_threads) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1** |
| **Minimum Value** | **1** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* If this value is greater than 1, **MyISAM** table indexes are created in parallel (each index in its own thread) during the **Repair by sorting** process. The default value is 1.
* **Note**
* Multithreaded repair is still beta-quality code.

* **[myisam\_sort\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_sort_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-sort-buffer-size=#** |
| **System Variable** | [**myisam\_sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_sort_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8388608** |
| **Minimum Value** | **4096** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* The size of the buffer that is allocated when sorting **MyISAM** indexes during a [**REPAIR TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#repair-table) or when creating indexes with [**CREATE INDEX**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-index) or [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table).

* **[myisam\_stats\_method](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_stats_method)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-stats-method=name** |
| **System Variable** | [**myisam\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_stats_method) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **nulls\_unequal** |
| **Valid Values** | **nulls\_equal**  **nulls\_unequal**  **nulls\_ignored** |

* How the server treats **NULL** values when collecting statistics about the distribution of index values for **MyISAM** tables. This variable has three possible values, **nulls\_equal**, **nulls\_unequal**, and **nulls\_ignored**. For **nulls\_equal**, all **NULL** index values are considered equal and form a single value group that has a size equal to the number of **NULL** values. For **nulls\_unequal**, **NULL** values are considered unequal, and each **NULL** forms a distinct value group of size 1. For **nulls\_ignored**, **NULL** values are ignored.
* The method that is used for generating table statistics influences how the optimizer chooses indexes for query execution, as described in [Section 8.3.8, “InnoDB and MyISAM Index Statistics Collection”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#index-statistics).

* **[myisam\_use\_mmap](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_myisam_use_mmap)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--myisam-use-mmap[={OFF|ON}]** |
| **System Variable** | [**myisam\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_use_mmap) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Use memory mapping for reading and writing **MyISAM** tables.

* **[mysql\_native\_password\_proxy\_users](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_mysql_native_password_proxy_users)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--mysql-native-password-proxy-users[={OFF|ON}]** |
| **System Variable** | [**mysql\_native\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mysql_native_password_proxy_users) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable controls whether the **mysql\_native\_password** built-in authentication plugin supports proxy users. It has no effect unless the [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) system variable is enabled. For information about user proxying, see [Section 6.2.18, “Proxy Users”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#proxy-users).

* **[named\_pipe](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_named_pipe)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--named-pipe[={OFF|ON}]** |
| **System Variable** | [**named\_pipe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Platform Specific** | Windows |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* (Windows only.) Indicates whether the server supports connections over named pipes.

* **[named\_pipe\_full\_access\_group](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_named_pipe_full_access_group)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--named-pipe-full-access-group=value** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**named\_pipe\_full\_access\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe_full_access_group) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Platform Specific** | Windows |
| **Type** | String |
| **Default Value** | **empty string** |
| **Valid Values** | **empty string**  **valid Windows local group name**  **\*everyone\*** |

* (Windows only.) The access control granted to clients on the named pipe created by the MySQL server is set to the minimum necessary for successful communication when the [**named\_pipe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_named_pipe) system variable is enabled to support named-pipe connections. Newer MySQL client software can open named pipe connections without any additional configuration; however, older client software may still require full access to open a named pipe connection.
* This variable sets the name of a Windows local group whose members are granted sufficient access by the MySQL server to use older named-pipe clients. As of MySQL 8.0.24, the default value is set to an empty string, which means that no Windows user is granted full access to the named pipe.
* A new Windows local group name (for example, **mysql\_old\_client\_users**) can be created in Windows and then used to replace the default value when access is absolutely necessary. In this case, limit the membership of the group to as few users as possible, removing users from the group when their client software is upgraded. A non-member of the group who attempts to open a connection to MySQL with the older named-pipe client is denied access until a Windows administrator adds the user to the group. Newly added users must log out and log in again to join the group (required by Windows).
* Setting the value to **'\*everyone\*'** provides a language-independent way of referring to the Everyone group on Windows. The Everyone group is not secure by default.

* **[net\_buffer\_length](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_net_buffer_length)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--net-buffer-length=#** |
| **System Variable** | [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **16384** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **1048576** |
| **Block Size** | **1024** |

* Each client thread is associated with a connection buffer and result buffer. Both begin with a size given by [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) but are dynamically enlarged up to [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) bytes as needed. The result buffer shrinks to [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) after each SQL statement.
* This variable should not normally be changed, but if you have very little memory, you can set it to the expected length of statements sent by clients. If statements exceed this length, the connection buffer is automatically enlarged. The maximum value to which [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) can be set is 1MB.
* The session value of this variable is read only.

* **[net\_read\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_net_read_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--net-read-timeout=#** |
| **System Variable** | [**net\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_read_timeout) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **30** |
| **Minimum Value** | **1** |

* The number of seconds to wait for more data from a connection before aborting the read. When the server is reading from the client, [**net\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_read_timeout) is the timeout value controlling when to abort. When the server is writing to the client, [**net\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_write_timeout) is the timeout value controlling when to abort. See also [**slave\_net\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_net_timeout).

* **[net\_retry\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_net_retry_count)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--net-retry-count=#** |
| **System Variable** | [**net\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_retry_count) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **10** |
| **Minimum Value** | **1** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* If a read or write on a communication port is interrupted, retry this many times before giving up. This value should be set quite high on FreeBSD because internal interrupts are sent to all threads.

* **[net\_write\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_net_write_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--net-write-timeout=#** |
| **System Variable** | [**net\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_write_timeout) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **60** |
| **Minimum Value** | **1** |

* The number of seconds to wait for a block to be written to a connection before aborting the write. See also [**net\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_read_timeout).

* **[new](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_new)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--new[={OFF|ON}]** |
| **System Variable** | [**new**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_new) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Disabled by** | **skip-new** |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable was used in MySQL 4.0 to turn on some 4.1 behaviors, and is retained for backward compatibility. Its value is always **OFF**.
* In NDB Cluster, setting this variable to **ON** makes it possible to employ partitioning types other than **KEY** or **LINEAR KEY** with [**NDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html) tables. This feature is experimental only, and not supported in production. For additional information, see [User-defined partitioning and the NDB storage engine (NDB Cluster)](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\partitioning.html#partitioning-limitations-ndb).

* **[ngram\_token\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ngram_token_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ngram-token-size=#** |
| **System Variable** | [**ngram\_token\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ngram_token_size) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **2** |
| **Minimum Value** | **1** |
| **Maximum Value** | **10** |

* Defines the n-gram token size for the n-gram full-text parser. The **ngram\_token\_size** option is read-only and can only be modified at startup. The default value is 2 (bigram). The maximum value is 10.
* For more information about how to configure this variable, see [Section 12.10.8, “ngram Full-Text Parser”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#fulltext-search-ngram).

* **[offline\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_offline_mode)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--offline-mode[={OFF|ON}]** |
| **System Variable** | [**offline\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_offline_mode) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the server is in “offline mode”, which has these characteristics:
  + Connected client users who do not have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege) are disconnected on the next request, with an appropriate error. Disconnection includes terminating running statements and releasing locks. Such clients also cannot initiate new connections, and receive an appropriate error.
  + Connected client users who have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege are not disconnected, and can initiate new connections to manage the server.
  + Replication threads are permitted to keep applying data to the server.

Only users who have the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege can control offline mode. To put a server in offline mode, change the value of the [**offline\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_offline_mode) system variable from **OFF** to **ON**. To resume normal operations, change [**offline\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_offline_mode) from **ON** to **OFF**. In offline mode, clients that are refused access receive an [**ER\_SERVER\_OFFLINE\_MODE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_server_offline_mode) error.

* **[old](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_old)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--old[={OFF|ON}]** |
| **System Variable** | [**old**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* [**old**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old) is a compatibility variable. It is disabled by default, but can be enabled at startup to revert the server to behaviors present in older versions.
* When [**old**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old) is enabled, it changes the default scope of index hints to that used prior to MySQL 5.1.17. That is, index hints with no **FOR** clause apply only to how indexes are used for row retrieval and not to resolution of **ORDER BY** or **GROUP BY** clauses. (See [Section 8.9.4, “Index Hints”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#index-hints).) Take care about enabling this in a replication setup. With statement-based binary logging, having different modes for the source and replicas might lead to replication errors.

* **[old\_alter\_table](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_old_alter_table)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--old-alter-table[={OFF|ON}]** |
| **System Variable** | [**old\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old_alter_table) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* When this variable is enabled, the server does not use the optimized method of processing an [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) operation. It reverts to using a temporary table, copying over the data, and then renaming the temporary table to the original, as used by MySQL 5.0 and earlier. For more information on the operation of [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), see [Section 13.1.9, “ALTER TABLE Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table).
* **ALTER TABLE ... DROP PARTITION** with [**old\_alter\_table=ON**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old_alter_table) rebuilds the partitioned table and attempts to move data from the dropped partition to another partition with a compatible **PARTITION ... VALUES** definition. Data that cannot be moved to another partition is deleted. In earlier releases, **ALTER TABLE ... DROP PARTITION** with [**old\_alter\_table=ON**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old_alter_table) deletes data stored in the partition and drops the partition.

* **[open\_files\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_open_files_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--open-files-limit=#** |
| **System Variable** | [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **5000, with possible adjustment** |
| **Minimum Value** | **0** |
| **Maximum Value** | **platform dependent** |

* The number of file descriptors available to [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) from the operating system:
  + At startup, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) reserves descriptors with setrlimit(), using the value requested at by setting this variable directly or by using the [--open-files-limit](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqld_safe_open-files-limit) option to [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe). If [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) produces the error **Too many open files**, try increasing the [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) value. Internally, the maximum value for this variable is the maximum unsigned integer value, but the actual maximum is platform dependent.
  + At runtime, the value of [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) indicates the number of file descriptors actually permitted to [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) by the operating system, which might differ from the value requested at startup. If the number of file descriptors requested during startup cannot be allocated, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) writes a warning to the error log.

The effective [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) value is based on the value specified at system startup (if any) and the values of [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) and [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache), using these formulas:

* + **10 + max\_connections + (table\_open\_cache \* 2)**
  + **max\_connections \* 5**
  + MySQL 8.0.19 and higher: The operating system limit.
  + Prior to MySQL 8.0.19:
    - The operating system limit if that limit is positive but not Infinity.
    - If the operating system limit is Infinity: **open\_files\_limit** value if specified at startup, 5000 if not.

The server attempts to obtain the number of file descriptors using the maximum of those values, capped to the maximum unsigned integer value. If that many descriptors cannot be obtained, the server attempts to obtain as many as the system permits.

The effective value is 0 on systems where MySQL cannot change the number of open files.

On Unix, the value cannot be set greater than the value displayed by the **ulimit -n** command.

* **[optimizer\_prune\_level](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_prune_level)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-prune-level=#** |
| **System Variable** | [**optimizer\_prune\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_prune_level) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **1** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1** |

* Controls the heuristics applied during query optimization to prune less-promising partial plans from the optimizer search space. A value of 0 disables heuristics so that the optimizer performs an exhaustive search. A value of 1 causes the optimizer to prune plans based on the number of rows retrieved by intermediate plans.

* **[optimizer\_search\_depth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_search_depth)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-search-depth=#** |
| **System Variable** | [**optimizer\_search\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_search_depth) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **62** |
| **Minimum Value** | **0** |
| **Maximum Value** | **62** |

* The maximum depth of search performed by the query optimizer. Values larger than the number of relations in a query result in better query plans, but take longer to generate an execution plan for a query. Values smaller than the number of relations in a query return an execution plan quicker, but the resulting plan may be far from being optimal. If set to 0, the system automatically picks a reasonable value.

* **[optimizer\_switch](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_switch)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-switch=value** |
| **System Variable** | [**optimizer\_switch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_switch) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Set |
| **Valid Values (≥ 8.0.22)** | **batched\_key\_access={on|off}**  **block\_nested\_loop={on|off}**  **condition\_fanout\_filter={on|off}**  **derived\_condition\_pushdown={on|off}**  **derived\_merge={on|off}**  **duplicateweedout={on|off}**  **engine\_condition\_pushdown={on|off}**  **firstmatch={on|off}**  **hash\_join={on|off}**  **index\_condition\_pushdown={on|off}**  **index\_merge={on|off}**  **index\_merge\_intersection={on|off}**  **index\_merge\_sort\_union={on|off}**  **index\_merge\_union={on|off}**  **loosescan={on|off}**  **materialization={on|off}**  **mrr={on|off}**  **mrr\_cost\_based={on|off}**  **prefer\_ordering\_index={on|off}**  **semijoin={on|off}**  **skip\_scan={on|off}**  **subquery\_materialization\_cost\_based={on|off}**  **use\_index\_extensions={on|off}**  **use\_invisible\_indexes={on|off}** |
| **Valid Values (≥ 8.0.21)** | **batched\_key\_access={on|off}**  **block\_nested\_loop={on|off}**  **condition\_fanout\_filter={on|off}**  **derived\_merge={on|off}**  **duplicateweedout={on|off}**  **engine\_condition\_pushdown={on|off}**  **firstmatch={on|off}**  **hash\_join={on|off}**  **index\_condition\_pushdown={on|off}**  **index\_merge={on|off}**  **index\_merge\_intersection={on|off}**  **index\_merge\_sort\_union={on|off}**  **index\_merge\_union={on|off}**  **loosescan={on|off}**  **materialization={on|off}**  **mrr={on|off}**  **mrr\_cost\_based={on|off}**  **prefer\_ordering\_index={on|off}**  **semijoin={on|off}**  **skip\_scan={on|off}**  **subquery\_materialization\_cost\_based={on|off}**  **use\_index\_extensions={on|off}**  **use\_invisible\_indexes={on|off}** |
| **Valid Values (≥ 8.0.18)** | **batched\_key\_access={on|off}**  **block\_nested\_loop={on|off}**  **condition\_fanout\_filter={on|off}**  **derived\_merge={on|off}**  **duplicateweedout={on|off}**  **engine\_condition\_pushdown={on|off}**  **firstmatch={on|off}**  **hash\_join={on|off}**  **index\_condition\_pushdown={on|off}**  **index\_merge={on|off}**  **index\_merge\_intersection={on|off}**  **index\_merge\_sort\_union={on|off}**  **index\_merge\_union={on|off}**  **loosescan={on|off}**  **materialization={on|off}**  **mrr={on|off}**  **mrr\_cost\_based={on|off}**  **semijoin={on|off}**  **skip\_scan={on|off}**  **subquery\_materialization\_cost\_based={on|off}**  **use\_index\_extensions={on|off}**  **use\_invisible\_indexes={on|off}** |
| **Valid Values (≥ 8.0.13)** | **batched\_key\_access={on|off}**  **block\_nested\_loop={on|off}**  **condition\_fanout\_filter={on|off}**  **derived\_merge={on|off}**  **duplicateweedout={on|off}**  **engine\_condition\_pushdown={on|off}**  **firstmatch={on|off}**  **index\_condition\_pushdown={on|off}**  **index\_merge={on|off}**  **index\_merge\_intersection={on|off}**  **index\_merge\_sort\_union={on|off}**  **index\_merge\_union={on|off}**  **loosescan={on|off}**  **materialization={on|off}**  **mrr={on|off}**  **mrr\_cost\_based={on|off}**  **semijoin={on|off}**  **skip\_scan={on|off}**  **subquery\_materialization\_cost\_based={on|off}**  **use\_index\_extensions={on|off}**  **use\_invisible\_indexes={on|off}** |
| **Valid Values (≤ 8.0.12)** | **batched\_key\_access={on|off}**  **block\_nested\_loop={on|off}**  **condition\_fanout\_filter={on|off}**  **derived\_merge={on|off}**  **duplicateweedout={on|off}**  **engine\_condition\_pushdown={on|off}**  **firstmatch={on|off}**  **index\_condition\_pushdown={on|off}**  **index\_merge={on|off}**  **index\_merge\_intersection={on|off}**  **index\_merge\_sort\_union={on|off}**  **index\_merge\_union={on|off}**  **loosescan={on|off}**  **materialization={on|off}**  **mrr={on|off}**  **mrr\_cost\_based={on|off}**  **semijoin={on|off}**  **subquery\_materialization\_cost\_based={on|off}**  **use\_index\_extensions={on|off}**  **use\_invisible\_indexes={on|off}** |

* The [**optimizer\_switch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_switch) system variable enables control over optimizer behavior. The value of this variable is a set of flags, each of which has a value of **on** or **off** to indicate whether the corresponding optimizer behavior is enabled or disabled. This variable has global and session values and can be changed at runtime. The global default can be set at server startup.
* To see the current set of optimizer flags, select the variable value:
* mysql> **SELECT @@optimizer\_switch\G**
* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
* @@optimizer\_switch: index\_merge=on,index\_merge\_union=on,
* index\_merge\_sort\_union=on,index\_merge\_intersection=on,
* engine\_condition\_pushdown=on,index\_condition\_pushdown=on,
* mrr=on,mrr\_cost\_based=on,block\_nested\_loop=on,
* batched\_key\_access=off,materialization=on,semijoin=on,
* loosescan=on,firstmatch=on,duplicateweedout=on,
* subquery\_materialization\_cost\_based=on,
* use\_index\_extensions=on,condition\_fanout\_filter=on,
* derived\_merge=on,use\_invisible\_indexes=off,skip\_scan=on,
* hash\_join=on,subquery\_to\_derived=off,
* prefer\_ordering\_index=on,hypergraph\_optimizer=off,
* derived\_condition\_pushdown=on
* For more information about the syntax of this variable and the optimizer behaviors that it controls, see [Section 8.9.2, “Switchable Optimizations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#switchable-optimizations).

* **[optimizer\_trace](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_trace)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-trace=value** |
| **System Variable** | [**optimizer\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* This variable controls optimizer tracing. For details, see [MySQL Internals: Tracing the Optimizer](https://dev.mysql.com/doc/internals/en/optimizer-tracing.html).

* **[optimizer\_trace\_features](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_trace_features)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-trace-features=value** |
| **System Variable** | [**optimizer\_trace\_features**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_features) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* This variable enables or disables selected optimizer tracing features. For details, see [MySQL Internals: Tracing the Optimizer](https://dev.mysql.com/doc/internals/en/optimizer-tracing.html).

* **[optimizer\_trace\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_trace_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-trace-limit=#** |
| **System Variable** | [**optimizer\_trace\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_limit) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1** |

* The maximum number of optimizer traces to display. For details, see [MySQL Internals: Tracing the Optimizer](https://dev.mysql.com/doc/internals/en/optimizer-tracing.html).

* **[optimizer\_trace\_max\_mem\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_trace_max_mem_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-trace-max-mem-size=#** |
| **System Variable** | [**optimizer\_trace\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_max_mem_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **1048576** |

* The maximum cumulative size of stored optimizer traces. For details, see [MySQL Internals: Tracing the Optimizer](https://dev.mysql.com/doc/internals/en/optimizer-tracing.html).

* **[optimizer\_trace\_offset](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_optimizer_trace_offset)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--optimizer-trace-offset=#** |
| **System Variable** | [**optimizer\_trace\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_offset) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **-1** |

* The offset of optimizer traces to display. For details, see [MySQL Internals: Tracing the Optimizer](https://dev.mysql.com/doc/internals/en/optimizer-tracing.html).
* **performance\_schema\_*xxx***

Performance Schema system variables are listed in [Section 27.15, “Performance Schema System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-system-variables). These variables may be used to configure Performance Schema operation.

* **[parser\_max\_mem\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_parser_max_mem_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--parser-max-mem-size=#** |
| **System Variable** | [**parser\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_parser_max_mem_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value (64-bit platforms)** | **18446744073709551615** |
| **Default Value (32-bit platforms)** | **4294967295** |
| **Minimum Value** | **10000000** |
| **Maximum Value (64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (32-bit platforms)** | **4294967295** |

* The maximum amount of memory available to the parser. The default value places no limit on memory available. The value can be reduced to protect against out-of-memory situations caused by parsing long or complex SQL statements.

* **[partial\_revokes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_partial_revokes)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--partial-revokes[={OFF|ON}]** |
| **Introduced** | 8.0.16 |
| **System Variable** | [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** (if partial revokes do not exist)  **ON** (if partial revokes exist) |

* Enabling this variable makes it possible to revoke privileges partially. Specifically, for users who have privileges at the global level, [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) enables privileges for specific schemas to be revoked while leaving the privileges in place for other schemas. For example, a user who has the global [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_update) privilege can be restricted from exercising this privilege on the **mysql** system schema. (Or, stated another way, the user is enabled to exercise the [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_update) privilege on all schemas except the **mysql** schema.) In this sense, the user's global [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_update) privilege is partially revoked.
* Once enabled, [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) cannot be disabled if any account has privilege restrictions. If any such account exists, disabling [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) fails:
  + For attempts to disable [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) at startup, the server logs an error message and enables [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes).
  + For attempts to disable [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) at runtime, an error occurs and the [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) value remains unchanged.

To disable [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) in this case, first modify each account that has partially revoked privileges, either by re-granting the privileges or by removing the account.

For more information, including instructions for removing partial revokes, see [Section 6.2.12, “Privilege Restriction Using Partial Revokes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#partial-revokes).

* **[password\_history](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_password_history)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--password-history=#** |
| **System Variable** | [**password\_history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_history) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4294967295** |

* This variable defines the global policy for controlling reuse of previous passwords based on required minimum number of password changes. For an account password used previously, this variable indicates the number of subsequent account password changes that must occur before the password can be reused. If the value is 0 (the default), there is no reuse restriction based on number of password changes.
* Changes to this variable apply immediately to all accounts defined with the **PASSWORD HISTORY DEFAULT** option.
* The global number-of-changes password reuse policy can be overridden as desired for individual accounts using the **PASSWORD HISTORY** option of the [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) and [**ALTER USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-user) statements. See [Section 6.2.15, “Password Management”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-management).

* **[password\_require\_current](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_password_require_current)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--password-require-current[={OFF|ON}]** |
| **Introduced** | 8.0.13 |
| **System Variable** | [**password\_require\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_require_current) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable defines the global policy for controlling whether attempts to change an account password must specify the current password to be replaced.
* Changes to this variable apply immediately to all accounts defined with the **PASSWORD REQUIRE CURRENT DEFAULT** option.
* The global verification-required policy can be overridden as desired for individual accounts using the **PASSWORD REQUIRE** option of the [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) and [**ALTER USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-user) statements. See [Section 6.2.15, “Password Management”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-management).

* **[password\_reuse\_interval](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_password_reuse_interval)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--password-reuse-interval=#** |
| **System Variable** | [**password\_reuse\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_reuse_interval) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4294967295** |

* This variable defines the global policy for controlling reuse of previous passwords based on time elapsed. For an account password used previously, this variable indicates the number of days that must pass before the password can be reused. If the value is 0 (the default), there is no reuse restriction based on time elapsed.
* Changes to this variable apply immediately to all accounts defined with the **PASSWORD REUSE INTERVAL DEFAULT** option.
* The global time-elapsed password reuse policy can be overridden as desired for individual accounts using the **PASSWORD REUSE INTERVAL** option of the [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) and [**ALTER USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-user) statements. See [Section 6.2.15, “Password Management”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-management).

* **[persisted\_globals\_load](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_persisted_globals_load)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--persisted-globals-load[={OFF|ON}]** |
| **System Variable** | [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Whether to load persisted configuration settings from the mysqld-auto.cnf file in the data directory. The server normally processes this file at startup after all other option files (see [Section 4.2.2.2, “Using Option Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-files)). Disabling [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load) causes the server startup sequence to skip **mysqld-auto.cnf**.
* To modify the contents of mysqld-auto.cnf, use the [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), and [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) statements. See [Section 5.1.9.3, “Persisted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables).

* **[persist\_only\_admin\_x509\_subject](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_persist_only_admin_x509_subject)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--persist-only-admin-x509-subject=string** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **empty string** |

* [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) and [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) enable system variables to be persisted to the mysqld-auto.cnf option file in the data directory (see [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable)). Persisting system variables enables runtime configuration changes that affect subsequent server restarts, which is convenient for remote administration not requiring direct access to MySQL server host option files. However, some system variables are nonpersistible or can be persisted only under certain restrictive conditions.
* The [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) system variable specifies the SSL certificate X.509 Subject value that users must have to be able to persist system variables that are persist-restricted. The default value is the empty string, which disables the Subject check so that persist-restricted system variables cannot be persisted by any user.
* If [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) is nonempty, users who connect to the server using an encrypted connection and supply an SSL certificate with the designated Subject value then can use [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) to persist persist-restricted system variables. For information about persist-restricted system variables and instructions for configuring MySQL to enable [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject), see [Section 5.1.9.4, “Nonpersistible and Persist-Restricted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#nonpersistible-system-variables).

* **[pid\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_pid_file)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--pid-file=file\_name** |
| **System Variable** | [**pid\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |

* The path name of the file in which the server writes its process ID. The server creates the file in the data directory unless an absolute path name is given to specify a different directory. If you specify this variable, you must specify a value. If you do not specify this variable, MySQL uses a default value of ***host\_name***.pid, where ***host\_name*** is the name of the host machine.
* The process ID file is used by other programs such as [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) to determine the server's process ID. On Windows, this variable also affects the default error log file name. See [Section 5.4.2, “The Error Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log).

* **[plugin\_dir](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_plugin_dir)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--plugin-dir=dir\_name** |
| **System Variable** | [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **BASEDIR/lib/plugin** |

* The path name of the plugin directory.
* If the plugin directory is writable by the server, it may be possible for a user to write executable code to a file in the directory using [**SELECT ... INTO DUMPFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select). This can be prevented by making [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) read only to the server or by setting [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) to a directory where [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) writes can be made safely.

* **[port](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_port)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--port=port\_num** |
| **System Variable** | [**port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_port) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **3306** |
| **Minimum Value** | **0** |
| **Maximum Value** | **65535** |

* The number of the port on which the server listens for TCP/IP connections. This variable can be set with the [--port](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_port) option.

* **[preload\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_preload_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--preload-buffer-size=#** |
| **System Variable** | [**preload\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_preload_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **32768** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **1073741824** |

* The size of the buffer that is allocated when preloading indexes.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[print\_identified\_with\_as\_hex](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_print_identified_with_as_hex)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--print-identified-with-as-hex[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**print\_identified\_with\_as\_hex**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_print_identified_with_as_hex) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Password hash values displayed in the **IDENTIFIED WITH** clause of output from [**SHOW CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-user) may contain unprintable characters that have adverse effects on terminal displays and in other environments. Enabling [**print\_identified\_with\_as\_hex**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_print_identified_with_as_hex) causes [**SHOW CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-user) to display such hash values as hexadecimal strings rather than as regular string literals. Hash values that do not contain unprintable characters still display as regular string literals, even with this variable enabled.

* **[profiling](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_profiling)**

If set to 0 or **OFF** (the default), statement profiling is disabled. If set to 1 or **ON**, statement profiling is enabled and the [**SHOW PROFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-profile) and [**SHOW PROFILES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-profiles) statements provide access to profiling information. See [Section 13.7.7.31, “SHOW PROFILES Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-profiles).

This variable is deprecated; expect it to be removed in a future MySQL release.

* **[profiling\_history\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_profiling_history_size)**

The number of statements for which to maintain profiling information if [**profiling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling) is enabled. The default value is 15. The maximum value is 100. Setting the value to 0 effectively disables profiling. See [Section 13.7.7.31, “SHOW PROFILES Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-profiles).

This variable is deprecated; expect it to be removed in a future MySQL release.

* **[protocol\_compression\_algorithms](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_protocol_compression_algorithms)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--protocol-compression-algorithms=value** |
| **Introduced** | 8.0.18 |
| **System Variable** | [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Set |
| **Default Value** | **zlib,zstd,uncompressed** |
| **Valid Values** | **zlib**  **zstd**  **uncompressed** |

* The compression algorithms that the server permits for incoming connections. These include connections by client programs and by servers participating in source/replica replication or Group Replication. Compression does not apply to connections for **FEDERATED** tables.
* [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) does not control connection compression for X Protocol. See [Section 20.5.5, “Connection Compression with X Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#x-plugin-connection-compression) for information on how this operates.
* The variable value is a list of one or more comma-separated compression algorithm names, in any order, chosen from the following items (not case-sensitive):
  + **zlib**: Permit connections that use the **zlib** compression algorithm.
  + **zstd**: Permit connections that use the **zstd** compression algorithm (zstd 1.3).
  + **uncompressed**: Permit uncompressed connections. If this algorithm name is not included in the [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) value, the server does not permit uncompressed connections. It permits only compressed connections that use whichever other algorithms are specified in the value, and there is no fallback to uncompressed connections.

The default value of **zlib,zstd,uncompressed** indicates that the server permits all compression algorithms.

For more information, see [Section 4.2.8, “Connection Compression Control”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#connection-compression-control).

* **[protocol\_version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_protocol_version)**

|  |  |
| --- | --- |
| **System Variable** | [**protocol\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_version) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |

* The version of the client/server protocol used by the MySQL server.

* **[proxy\_user](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_proxy_user)**

|  |  |
| --- | --- |
| **System Variable** | [**proxy\_user**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_proxy_user) |
| **Scope** | Session |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* If the current client is a proxy for another user, this variable is the proxy user account name. Otherwise, this variable is **NULL**. See [Section 6.2.18, “Proxy Users”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#proxy-users).

* **[pseudo\_slave\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_pseudo_slave_mode)**

|  |  |
| --- | --- |
| **System Variable** | [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |

* This system variable is for internal server use. [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) assists with the correct handling of transactions that originated on older or newer servers than the server currently processing them. [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) sets the value of [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) to true before executing any SQL statements.
* Setting the session value of this system variable is a restricted operation. The session user must have either the [**REPLICATION\_APPLIER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_replication-applier) privilege (see [Section 17.3.3, “Replication Privilege Checks”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-privilege-checks)), or privileges sufficient to set restricted session variables (see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)). However, note that the variable is not intended for users to set; it is set automatically by the replication infrastructure.
* [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) has the following effects on the handling of prepared XA transactions, which can be attached to or detached from the handling session (by default, the session that issues [**XA START**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#xa)):
  + If true, and the handling session has executed an internal-use [**BINLOG**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#binlog) statement, XA transactions are automatically detached from the session as soon as the first part of the transaction up to [**XA PREPARE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#xa) finishes, so they can be committed or rolled back by any session that has the [**XA\_RECOVER\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_xa-recover-admin) privilege.
  + If false, XA transactions remain attached to the handling session as long as that session is alive, during which time no other session can commit the transaction. The prepared transaction is only detached if the session disconnects or the server restarts.

[**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) has the following effects on the **original\_commit\_timestamp** replication delay timestamp and the [**original\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_server_version) system variable:

* + If true, transactions that do not explicitly set **original\_commit\_timestamp** or [**original\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_server_version) are assumed to originate on another, unknown server, so the value 0, meaning unknown, is assigned to both the timestamp and the system variable.
  + If false, transactions that do not explicitly set **original\_commit\_timestamp** or [**original\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_server_version) are assumed to originate on the current server, so the current timestamp and the current server's version are assigned to the timestamp and the system variable.

In MySQL 8.0.14 and later, **pseudo\_slave\_mode** has the following effects on the handling of a statement that sets one or more unsupported (removed or unknown) SQL modes:

* + If true, the server ignores the unsupported mode and raises a warning.
  + If false, the server rejects the statement with [**ER\_UNSUPPORTED\_SQL\_MODE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_unsupported_sql_mode).

* **[pseudo\_thread\_id](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_pseudo_thread_id)**

|  |  |
| --- | --- |
| **System Variable** | [**pseudo\_thread\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_thread_id) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |

* This variable is for internal server use.
* **Warning**
* Changing the session value of the [**pseudo\_thread\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_thread_id) system variable changes the value returned by the [**CONNECTION\_ID()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_connection-id) function.
* As of MySQL 8.0.14, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[query\_alloc\_block\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_query_alloc_block_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--query-alloc-block-size=#** |
| **System Variable** | [**query\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_alloc_block_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8192** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **4294967295** |
| **Unit** | **bytes** |
| **Block Size** | **1024** |

* The allocation size in bytes of memory blocks that are allocated for objects created during statement parsing and execution. If you have problems with memory fragmentation, it might help to increase this parameter.

* **[query\_prealloc\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_query_prealloc_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--query-prealloc-size=#** |
| **System Variable** | [**query\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_prealloc_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8192** |
| **Minimum Value** | **8192** |
| **Maximum Value (64-bit platforms)** | **18446744073709547520** |
| **Maximum Value (32-bit platforms)** | **4294967295** |
| **Block Size** | **1024** |

* The size in bytes of the persistent buffer used for statement parsing and execution. This buffer is not freed between statements. If you are running complex queries, a larger [**query\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_prealloc_size) value might be helpful in improving performance, because it can reduce the need for the server to perform memory allocation during query execution operations.

* **[rand\_seed1](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_rand_seed1)**

|  |  |
| --- | --- |
| **System Variable** | [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |

* The [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1) and [**rand\_seed2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed2) variables exist as session variables only, and can be set but not read. The variables—but not their values—are shown in the output of [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables).
* The purpose of these variables is to support replication of the [**RAND()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_rand) function. For statements that invoke [**RAND()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_rand), the source passes two values to the replica, where they are used to seed the random number generator. The replica uses these values to set the session variables [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1) and [**rand\_seed2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed2) so that [**RAND()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_rand) on the replica generates the same value as on the source.

* **[rand\_seed2](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_rand_seed2)**

See the description for [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1).

* **[range\_alloc\_block\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_range_alloc_block_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--range-alloc-block-size=#** |
| **System Variable** | [**range\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_alloc_block_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **4096** |
| **Minimum Value** | **4096** |
| **Maximum Value (64-bit platforms)** | **18446744073709547520** |
| **Maximum Value** | **4294967295** |
| **Block Size** | **1024** |

* The size in bytes of blocks that are allocated when doing range optimization.

* **[range\_optimizer\_max\_mem\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_range_optimizer_max_mem_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--range-optimizer-max-mem-size=#** |
| **System Variable** | [**range\_optimizer\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_optimizer_max_mem_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8388608** |
| **Minimum Value** | **0** |
| **Maximum Value** | **18446744073709551615** |

* The limit on memory consumption for the range optimizer. A value of 0 means “no limit.” If an execution plan considered by the optimizer uses the range access method but the optimizer estimates that the amount of memory needed for this method would exceed the limit, it abandons the plan and considers other plans. For more information, see [Limiting Memory Use for Range Optimization](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#range-optimization-memory-use).

* **[rbr\_exec\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_rbr_exec_mode)**

|  |  |
| --- | --- |
| **System Variable** | [**rbr\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rbr_exec_mode) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **STRICT** |
| **Valid Values** | **IDEMPOTENT**  **STRICT** |

* For internal use by [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog). This variable switches the server between **IDEMPOTENT** mode and **STRICT** mode. **IDEMPOTENT** mode causes suppression of duplicate-key and no-key-found errors in [**BINLOG**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#binlog) statements generated by [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog). This mode is useful when replaying a row-based binary log on a server that causes conflicts with existing data. [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) sets this mode when you specify the [--idempotent](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqlbinlog_idempotent) option by writing the following to the output:
* SET SESSION RBR\_EXEC\_MODE=IDEMPOTENT;
* As of MySQL 8.0.18, setting the session value of this system variable is no longer a restricted operation.

* **[read\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_read_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--read-buffer-size=#** |
| **System Variable** | [**read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **131072** |
| **Minimum Value** | **8192** |
| **Maximum Value** | **2147479552** |
| **Block Size** | **4096** |

* Each thread that does a sequential scan for a **MyISAM** table allocates a buffer of this size (in bytes) for each table it scans. If you do many sequential scans, you might want to increase this value, which defaults to 131072. The value of this variable should be a multiple of 4KB. If it is set to a value that is not a multiple of 4KB, its value is rounded down to the nearest multiple of 4KB.
* This option is also used in the following context for all storage engines:
  + For caching the indexes in a temporary file (not a temporary table), when sorting rows for **ORDER BY**.
  + For bulk insert into partitions.
  + For caching results of nested queries.

[**read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_buffer_size) is also used in one other storage engine-specific way: to determine the memory block size for [**MEMORY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#memory-storage-engine) tables.

Beginning with MySQL 8.0.22, the value of [**select\_into\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_buffer_size) is used in place of the value of **read\_buffer\_size** for the buffer used when executing [**SELECT INTO DUMPFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into) and **SELECT INTO OUTFILE** statements.

For more information about memory use during different operations, see [Section 8.12.3.1, “How MySQL Uses Memory”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#memory-use).

* **[read\_only](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_read_only)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--read-only[={OFF|ON}]** |
| **System Variable** | [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If the [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) system variable is enabled, the server permits no client updates except from users who have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege). This variable is disabled by default.
* The server also supports a [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) system variable (disabled by default), which has these effects:
  + If [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) is enabled, the server prohibits client updates, even from users who have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege.
  + Setting [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) to **ON** implicitly forces [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) to **ON**.
  + Setting [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) to **OFF** implicitly forces [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) to **OFF**.

Even with [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) enabled, the server permits these operations:

* + Updates performed by replication threads, if the server is a replica. In replication setups, it can be useful to enable [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) on replica servers to ensure that replicas accept updates only from the replication source server and not from clients.
  + Writes to the system table **mysql.gtid\_executed**, which stores GTIDs for executed transactions that are not present in the current binary log file.
  + Use of [**ANALYZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table) or [**OPTIMIZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#optimize-table) statements. The purpose of read-only mode is to prevent changes to table structure or contents. Analysis and optimization do not qualify as such changes. This means, for example, that consistency checks on read-only replicas can be performed with [**mysqlcheck --all-databases --analyze**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlcheck).
  + Operations on **TEMPORARY** tables.
  + Inserts into the log tables (**mysql.general\_log** and **mysql.slow\_log**); see [Section 5.4.1, “Selecting General Query Log and Slow Query Log Output Destinations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations).
  + Updates to Performance Schema tables, such as [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) or [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table) operations.

Changes to [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) on a replication source server are not replicated to replica servers. The value can be set on a replica server independent of the setting on the source.

The following conditions apply to attempts to enable [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) (including implicit attempts resulting from enabling [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only)):

* + The attempt fails and an error occurs if you have any explicit locks (acquired with [**LOCK TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#lock-tables)) or have a pending transaction.
  + The attempt blocks while other clients have any ongoing statement, active **LOCK TABLES WRITE**, or ongoing commit, until the locks are released and the statements and transactions end. While the attempt to enable [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) is pending, requests by other clients for table locks or to begin transactions also block until [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) has been set.
  + The attempt blocks if there are active transactions that hold metadata locks, until those transactions end.
  + [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) can be enabled while you hold a global read lock (acquired with [**FLUSH TABLES WITH READ LOCK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables-with-read-lock)) because that does not involve table locks.

* **[read\_rnd\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_read_rnd_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--read-rnd-buffer-size=#** |
| **System Variable** | [**read\_rnd\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_rnd_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **262144** |
| **Minimum Value** | **1** |
| **Maximum Value** | **2147483647** |

* This variable is used for reads from **MyISAM** tables, and, for any storage engine, for Multi-Range Read optimization.
* When reading rows from a **MyISAM** table in sorted order following a key-sorting operation, the rows are read through this buffer to avoid disk seeks. See [Section 8.2.1.16, “ORDER BY Optimization”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#order-by-optimization). Setting the variable to a large value can improve **ORDER BY** performance by a lot. However, this is a buffer allocated for each client, so you should not set the global variable to a large value. Instead, change the session variable only from within those clients that need to run large queries.
* For more information about memory use during different operations, see [Section 8.12.3.1, “How MySQL Uses Memory”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#memory-use). For information about Multi-Range Read optimization, see [Section 8.2.1.11, “Multi-Range Read Optimization”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#mrr-optimization).

* **[regexp\_stack\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_regexp_stack_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--regexp-stack-limit=#** |
| **System Variable** | [**regexp\_stack\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_stack_limit) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8000000** |
| **Minimum Value** | **0** |
| **Maximum Value** | **2147483647** |

* The maximum available memory in bytes for the internal stack used for regular expression matching operations performed by [**REGEXP\_LIKE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_regexp-like) and similar functions (see [Section 12.8.2, “Regular Expressions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#regexp)).

* **[regexp\_time\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_regexp_time_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--regexp-time-limit=#** |
| **System Variable** | [**regexp\_time\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_time_limit) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **32** |
| **Minimum Value** | **0** |
| **Maximum Value** | **2147483647** |

* The time limit for regular expression matching operations performed by [**REGEXP\_LIKE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_regexp-like) and similar functions (see [Section 12.8.2, “Regular Expressions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#regexp)). This limit is expressed as the maximum permitted number of steps performed by the match engine, and thus affects execution time only indirectly. Typically, it is on the order of milliseconds.

* **[require\_row\_format](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_require_row_format)**

|  |  |
| --- | --- |
| **Introduced** | 8.0.19 |
| **System Variable** | [**require\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_row_format) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable is for internal server use by replication and [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog). It restricts DML events executed in the session to events encoded in row-based binary logging format only, and temporary tables cannot be created. Queries that do not respect the restrictions fail.
* Setting the session value of this system variable to **ON** requires no privileges. Setting the session value of this system variable to **OFF** is a restricted operation, and the session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[require\_secure\_transport](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_require_secure_transport)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--require-secure-transport[={OFF|ON}]** |
| **System Variable** | [**require\_secure\_transport**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_secure_transport) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether client connections to the server are required to use some form of secure transport. When this variable is enabled, the server permits only TCP/IP connections encrypted using TLS/SSL, or connections that use a socket file (on Unix) or shared memory (on Windows). The server rejects nonsecure connection attempts, which fail with an [**ER\_SECURE\_TRANSPORT\_REQUIRED**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_secure_transport_required) error.
* This capability supplements per-account SSL requirements, which take precedence. For example, if an account is defined with **REQUIRE SSL**, enabling [**require\_secure\_transport**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_secure_transport) does not make it possible to use the account to connect using a Unix socket file.
* It is possible for a server to have no secure transports available. For example, a server on Windows supports no secure transports if started without specifying any SSL certificate or key files and with the [**shared\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory) system variable disabled. Under these conditions, attempts to enable [**require\_secure\_transport**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_secure_transport) at startup cause the server to write a message to the error log and exit. Attempts to enable the variable at runtime fail with an [**ER\_NO\_SECURE\_TRANSPORTS\_CONFIGURED**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_no_secure_transports_configured) error.
* See also [Configuring Encrypted Connections as Mandatory](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#mandatory-encrypted-connections).

* **[resultset\_metadata](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_resultset_metadata)**

|  |  |
| --- | --- |
| **System Variable** | [**resultset\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_resultset_metadata) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **FULL** |
| **Valid Values** | **FULL**  **NONE** |

* For connections for which metadata transfer is optional, the client sets the [**resultset\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_resultset_metadata) system variable to control whether the server returns result set metadata. Permitted values are **FULL** (return all metadata; this is the default) and **NONE** (return no metadata).
* For connections that are not metadata-optional, setting [**resultset\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_resultset_metadata) to **NONE** produces an error.
* For details about managing result set metadata transfer, see [Optional Result Set Metadata](https://dev.mysql.com/doc/c-api/8.0/en/c-api-optional-metadata.html).

* **[secondary\_engine\_cost\_threshold](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_secondary_engine_cost_threshold)**

|  |  |
| --- | --- |
| **Introduced** | 8.0.16 |
| **System Variable** | [**secondary\_engine\_cost\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secondary_engine_cost_threshold) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Numeric |
| **Default Value** | **100000.000000** |
| **Minimum Value** | **0** |
| **Maximum Value** | **DBL\_MAX (maximum double value)** |

* The optimizer cost threshold for query offload to a secondary engine.
* For use with HeatWave. See [HeatWave User Guide](https://dev.mysql.com/doc/heatwave/en/).

* **[schema\_definition\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_schema_definition_cache)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--schema-definition-cache=#** |
| **System Variable** | [**schema\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_schema_definition_cache) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **256** |
| **Minimum Value** | **256** |
| **Maximum Value** | **524288** |

* Defines a limit for the number of schema definition objects, both used and unused, that can be kept in the dictionary object cache.
* Unused schema definition objects are only kept in the dictionary object cache when the number in use is less than the capacity defined by **schema\_definition\_cache**.
* A setting of **0** means that schema definition objects are only kept in the dictionary object cache while they are in use.
* For more information, see [Section 14.4, “Dictionary Object Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-dictionary.html#data-dictionary-object-cache).

* **[secure\_file\_priv](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_secure_file_priv)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--secure-file-priv=dir\_name** |
| **System Variable** | [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **platform specific** |
| **Valid Values** | **empty string**  **dirname**  **NULL** |

* This variable is used to limit the effect of data import and export operations, such as those performed by the [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) and [**SELECT ... INTO OUTFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into) statements and the [**LOAD\_FILE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_load-file) function. These operations are permitted only to users who have the [**FILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_file) privilege.
* [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) may be set as follows:
  + If empty, the variable has no effect. This is not a secure setting.
  + If set to the name of a directory, the server limits import and export operations to work only with files in that directory. The directory must exist; the server does not create it.
  + If set to **NULL**, the server disables import and export operations.

The default value is platform specific and depends on the value of the [INSTALL\_LAYOUT](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_install_layout) **CMake** option, as shown in the following table. To specify the default [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) value explicitly if you are building from source, use the [INSTALL\_SECURE\_FILE\_PRIVDIR](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_install_secure_file_privdir) **CMake** option.

| **INSTALL\_LAYOUT Value** | **Default secure\_file\_priv Value** |
| --- | --- |
| **STANDALONE** | empty |
| **DEB**, **RPM**, **SVR4** | /var/lib/mysql-files |
| Otherwise | mysql-files under the [CMAKE\_INSTALL\_PREFIX](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_cmake_install_prefix) value |

The server checks the value of [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) at startup and writes a warning to the error log if the value is insecure. A non-**NULL** value is considered insecure if it is empty, or the value is the data directory or a subdirectory of it, or a directory that is accessible by all users. If [**secure\_file\_priv**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secure_file_priv) is set to a nonexistent path, the server writes an error message to the error log and exits.

* **[select\_into\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_select_into_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--select-into-buffer-size=#** |
| **Introduced** | 8.0.22 |
| **System Variable** | [**select\_into\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **131072** |
| **Minimum Value** | **8192** |
| **Maximum Value** | **2147479552** |
| **Unit** | **bytes** |
| **Block Size** | **4096** |

* When using [**SELECT INTO OUTFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into) or **SELECT INTO DUMPFILE** to dump data into one or more files for backup creation, data migration, or other purposes, writes can often be buffered and then trigger a large burst of write I/O activity to the disk or other storage device and stall other queries that are more sensitive to latency. You can use this variable to control the size of the buffer used to write data to the storage device to determine when buffer synchronization should occur, and thus to prevent write stalls of the kind just described from occurring.
* **select\_into\_buffer\_size** overrides any value set for [**read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_buffer_size). (**select\_into\_buffer\_size** and **read\_buffer\_size** have the same default, maximum, and minimum values.) You can also use [**select\_into\_disk\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync_delay) to set a timeout to be observed afterwards, each time synchronization takes place.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[select\_into\_disk\_sync](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_select_into_disk_sync)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--select-into-disk-sync={ON|OFF}** |
| **Introduced** | 8.0.22 |
| **System Variable** | [**select\_into\_disk\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF**  **ON** |

* When set on **ON**, enables buffer synchronization of writes to an output file by a long-running [**SELECT INTO OUTFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into) or **SELECT INTO DUMPFILE** statement using [**select\_into\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_buffer_size).

* **[select\_into\_disk\_sync\_delay](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_select_into_disk_sync_delay)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--select-into-disk-sync-delay=#** |
| **Introduced** | 8.0.22 |
| **System Variable** | [**select\_into\_disk\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync_delay) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **31536000** |
| **Unit** | **milliseconds** |

* When buffer synchronization of writes to an output file by a long-running [**SELECT INTO OUTFILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select-into) or **SELECT INTO DUMPFILE** statement is enabled by [**select\_into\_disk\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync), this variable sets an optional delay (in milliseconds) following synchronization. **0** (the default) means no delay.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[session\_track\_gtids](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_session_track_gtids)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--session-track-gtids=value** |
| **System Variable** | [**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF**  **OWN\_GTID**  **ALL\_GTIDS** |

* Controls whether the server returns GTIDs to the client, enabling the client to use them to track the server state. Depending on the variable value, at the end of executing each transaction, the server’s GTIDs are captured and returned to the client as part of the acknowledgement. The possible values for [**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) are as follows:
  + **OFF**: The server does not return GTIDs to the client. This is the default.
  + **OWN\_GTID**: The server returns the GTIDs for all transactions that were successfully committed by this client in its current session since the last acknowledgement. Typically, this is the single GTID for the last transaction committed, but if a single client request resulted in multiple transactions, the server returns a GTID set containing all the relevant GTIDs.
  + **ALL\_GTIDS**: The server returns the global value of its [**gtid\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed) system variable, which it reads at a point after the transaction is successfully committed. As well as the GTID for the transaction just committed, this GTID set includes all transactions committed on the server by any client, and can include transactions committed after the point when the transaction currently being acknowledged was committed.

[**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) cannot be set within transactional context.

For more information about session state tracking, see [Section 5.1.18, “Server Tracking of Client Session State Changes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#session-state-tracking).

* **[session\_track\_schema](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_session_track_schema)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--session-track-schema[={OFF|ON}]** |
| **System Variable** | [**session\_track\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_schema) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Controls whether the server tracks when the default schema (database) is set within the current session and notifies the client to make the schema name available.
* If the schema name tracker is enabled, name notification occurs each time the default schema is set, even if the new schema name is the same as the old.
* For more information about session state tracking, see [Section 5.1.18, “Server Tracking of Client Session State Changes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#session-state-tracking).

* **[session\_track\_state\_change](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_session_track_state_change)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--session-track-state-change[={OFF|ON}]** |
| **System Variable** | [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Controls whether the server tracks changes to the state of the current session and notifies the client when state changes occur. Changes can be reported for these attributes of client session state:
  + The default schema (database).
  + Session-specific values for system variables.
  + User-defined variables.
  + Temporary tables.
  + Prepared statements.

If the session state tracker is enabled, notification occurs for each change that involves tracked session attributes, even if the new attribute values are the same as the old. For example, setting a user-defined variable to its current value results in a notification.

The [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) variable controls only notification of when changes occur, not what the changes are. For example, state-change notifications occur when the default schema is set or tracked session system variables are assigned, but the notification does not include the schema name or variable values. To receive notification of the schema name or session system variable values, use the [**session\_track\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_schema) or [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) system variable, respectively.

**Note**

Assigning a value to [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) itself is not considered a state change and is not reported as such. However, if its name listed in the value of [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables), any assignments to it do result in notification of the new value.

For more information about session state tracking, see [Section 5.1.18, “Server Tracking of Client Session State Changes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#session-state-tracking).

* **[session\_track\_system\_variables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_session_track_system_variables)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--session-track-system-variables=#** |
| **System Variable** | [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **time\_zone, autocommit, character\_set\_client, character\_set\_results, character\_set\_connection** |

* Controls whether the server tracks assignments to session system variables and notifies the client of the name and value of each assigned variable. The variable value is a comma-separated list of variables for which to track assignments. By default, notification is enabled for [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone), [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit), [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client), [**character\_set\_results**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_results), and [**character\_set\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_connection). (The latter three variables are those affected by [**SET NAMES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-names).)
* The special value **\*** causes the server to track assignments to all session variables. If given, this value must be specified by itself without specific system variable names.
* To disable notification of session variable assignments, set [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) to the empty string.
* If session system variable tracking is enabled, notification occurs for all assignments to tracked session variables, even if the new values are the same as the old.
* For more information about session state tracking, see [Section 5.1.18, “Server Tracking of Client Session State Changes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#session-state-tracking).

* **[session\_track\_transaction\_info](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_session_track_transaction_info)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--session-track-transaction-info=value** |
| **System Variable** | [**session\_track\_transaction\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_transaction_info) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF**  **STATE**  **CHARACTERISTICS** |

* Controls whether the server tracks the state and characteristics of transactions within the current session and notifies the client to make this information available. These [**session\_track\_transaction\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_transaction_info) values are permitted:
  + **OFF**: Disable transaction state tracking. This is the default.
  + **STATE**: Enable transaction state tracking without characteristics tracking. State tracking enables the client to determine whether a transaction is in progress and whether it could be moved to a different session without being rolled back.
  + **CHARACTERISTICS**: Enable transaction state tracking, including characteristics tracking. Characteristics tracking enables the client to determine how to restart a transaction in another session so that it has the same characteristics as in the original session. The following characteristics are relevant for this purpose:
  + ISOLATION LEVEL
  + READ ONLY
  + READ WRITE
  + WITH CONSISTENT SNAPSHOT

For a client to safely relocate a transaction to another session, it must track not only transaction state but also transaction characteristics. In addition, the client must track the [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) and [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) system variables to correctly determine the session defaults. (To track these variables, list them in the value of the [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) system variable.)

For more information about session state tracking, see [Section 5.1.18, “Server Tracking of Client Session State Changes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#session-state-tracking).

* **[sha256\_password\_auto\_generate\_rsa\_keys](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sha256_password_auto_generate_rsa_keys)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sha256-password-auto-generate-rsa-keys[={OFF|ON}]** |
| **System Variable** | [**sha256\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_auto_generate_rsa_keys) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* The server uses this variable to determine whether to autogenerate RSA private/public key-pair files in the data directory if they do not already exist.
* At startup, the server automatically generates RSA private/public key-pair files in the data directory if all of these conditions are true: The [**sha256\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_auto_generate_rsa_keys) or [**caching\_sha2\_password\_auto\_generate\_rsa\_keys**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_auto_generate_rsa_keys) system variable is enabled; no RSA options are specified; the RSA files are missing from the data directory. These key-pair files enable secure password exchange using RSA over unencrypted connections for accounts authenticated by the **sha256\_password** or **caching\_sha2\_password** plugin; see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sha256-pluggable-authentication), and [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#caching-sha2-pluggable-authentication).
* For more information about RSA file autogeneration, including file names and characteristics, see [Section 6.3.3.1, “Creating SSL and RSA Certificates and Keys using MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#creating-ssl-rsa-files-using-mysql)
* The [**auto\_generate\_certs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_auto_generate_certs) system variable is related but controls autogeneration of SSL certificate and key files needed for secure connections using SSL.

* **[sha256\_password\_private\_key\_path](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sha256_password_private_key_path)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sha256-password-private-key-path=file\_name** |
| **System Variable** | [**sha256\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_private_key_path) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **private\_key.pem** |

* The value of this variable is the path name of the RSA private key file for the **sha256\_password** authentication plugin. If the file is named as a relative path, it is interpreted relative to the server data directory. The file must be in PEM format.
* **Important**
* Because this file stores a private key, its access mode should be restricted so that only the MySQL server can read it.
* For information about **sha256\_password**, see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sha256-pluggable-authentication).

* **[sha256\_password\_proxy\_users](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sha256_password_proxy_users)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sha256-password-proxy-users[={OFF|ON}]** |
| **System Variable** | [**sha256\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_proxy_users) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable controls whether the **sha256\_password** built-in authentication plugin supports proxy users. It has no effect unless the [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) system variable is enabled. For information about user proxying, see [Section 6.2.18, “Proxy Users”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#proxy-users).

* **[sha256\_password\_public\_key\_path](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sha256_password_public_key_path)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sha256-password-public-key-path=file\_name** |
| **System Variable** | [**sha256\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_public_key_path) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **public\_key.pem** |

* The value of this variable is the path name of the RSA public key file for the **sha256\_password** authentication plugin. If the file is named as a relative path, it is interpreted relative to the server data directory. The file must be in PEM format. Because this file stores a public key, copies can be freely distributed to client users. (Clients that explicitly specify a public key when connecting to the server using RSA password encryption must use the same public key as that used by the server.)
* For information about **sha256\_password**, including information about how clients specify the RSA public key, see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sha256-pluggable-authentication).

* **[shared\_memory](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_shared_memory)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--shared-memory[={OFF|ON}]** |
| **System Variable** | [**shared\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Platform Specific** | Windows |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* (Windows only.) Whether the server permits shared-memory connections.

* **[shared\_memory\_base\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_shared_memory_base_name)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--shared-memory-base-name=name** |
| **System Variable** | [**shared\_memory\_base\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory_base_name) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Platform Specific** | Windows |
| **Type** | String |
| **Default Value** | **MYSQL** |

* (Windows only.) The name of shared memory to use for shared-memory connections. This is useful when running multiple MySQL instances on a single physical machine. The default name is **MYSQL**. The name is case-sensitive.
* This variable applies only if the server is started with the [**shared\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory) system variable enabled to support shared-memory connections.

* **[show\_create\_table\_skip\_secondary\_engine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_show_create_table_skip_secondary_engine)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--show-create-table-skip-secondary-engine[={OFF|ON}]** |
| **Introduced** | 8.0.18 |
| **System Variable** | [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Enabling [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) causes the **SECONDARY ENGINE** clause to be excluded from [**SHOW CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table) output, and from [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statements dumped by the [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) utility.
* [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) provides the [--show-create-skip-secondary-engine](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqldump_show-create-skip-secondary-engine) option. When specified, it enables the [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) system variable for the duration of the dump operation.
* Attempting a [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) operation with the [--show-create-skip-secondary-engine](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqldump_show-create-skip-secondary-engine) option on a release prior to MySQL 8.0.18 that does not support the [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) variable causes an error.
* For use with HeatWave. See [HeatWave User Guide](https://dev.mysql.com/doc/heatwave/en/).

* **[show\_create\_table\_verbosity](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_show_create_table_verbosity)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--show-create-table-verbosity[={OFF|ON}]** |
| **System Variable** | [**show\_create\_table\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_verbosity) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* [**SHOW CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table) normally does not show the **ROW\_FORMAT** table option if the row format is the default format. Enabling this variable causes [**SHOW CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table) to display **ROW\_FORMAT** regardless of whether it is the default format.

* **[show\_old\_temporals](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_show_old_temporals)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--show-old-temporals[={OFF|ON}]** |
| **Deprecated** | Yes |
| **System Variable** | [**show\_old\_temporals**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_old_temporals) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether [**SHOW CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table) output includes comments to flag temporal columns found to be in pre-5.6.4 format ([**TIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#time), [**DATETIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime), and [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns without support for fractional seconds precision). This variable is disabled by default. If enabled, [**SHOW CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table) output looks like this:
* CREATE TABLE `mytbl` (
* `ts` timestamp /\* 5.5 binary format \*/ NOT NULL DEFAULT CURRENT\_TIMESTAMP,
* `dt` datetime /\* 5.5 binary format \*/ DEFAULT NULL,
* `t` time /\* 5.5 binary format \*/ DEFAULT NULL
* ) DEFAULT CHARSET=utf8mb4
* Output for the **COLUMN\_TYPE** column of the [**INFORMATION\_SCHEMA.COLUMNS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-columns-table) table is affected similarly.
* This variable is deprecated and subject to removal in a future MySQL release.
* As of MySQL 8.0.26, setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[skip\_external\_locking](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_skip_external_locking)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-external-locking[={OFF|ON}]** |
| **System Variable** | [**skip\_external\_locking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_external_locking) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* This is **OFF** if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) uses external locking (system locking), **ON** if external locking is disabled. This affects only [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) table access.
* This variable is set by the [--external-locking](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_external-locking) or [--skip-external-locking](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_external-locking) option. External locking is disabled by default.
* External locking affects only [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) table access. For more information, including conditions under which it can and cannot be used, see [Section 8.11.5, “External Locking”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#external-locking).

* **[skip\_name\_resolve](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_skip_name_resolve)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-name-resolve[={OFF|ON}]** |
| **System Variable** | [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether to resolve host names when checking client connections. If this variable is **OFF**, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) resolves host names when checking client connections. If it is **ON**, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) uses only IP numbers; in this case, all **Host** column values in the grant tables must be IP addresses. See [Section 5.1.12.3, “DNS Lookups and the Host Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache).
* Depending on the network configuration of your system and the **Host** values for your accounts, clients may need to connect using an explicit [--host](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) option, such as [--host=127.0.0.1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) or [--host=::1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host).
* An attempt to connect to the host **127.0.0.1** normally resolves to the **localhost** account. However, this fails if the server is run with [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) enabled. If you plan to do that, make sure an account exists that can accept a connection. For example, to be able to connect as **root** using [--host=127.0.0.1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) or [--host=::1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host), create these accounts:
* CREATE USER 'root'@'127.0.0.1' IDENTIFIED BY '***root-password***';
* CREATE USER 'root'@'::1' IDENTIFIED BY '***root-password***';

* **[skip\_networking](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_skip_networking)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-networking[={OFF|ON}]** |
| **System Variable** | [**skip\_networking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_networking) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable controls whether the server permits TCP/IP connections. By default, it is disabled (permit TCP connections). If enabled, the server permits only local (non-TCP/IP) connections and all interaction with [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) must be made using named pipes or shared memory (on Windows) or Unix socket files (on Unix). This option is highly recommended for systems where only local clients are permitted. See [Section 5.1.12.3, “DNS Lookups and the Host Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache).
* Because starting the server with [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) disables authentication checks, the server also disables remote connections in that case by enabling [**skip\_networking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_networking).

* **[skip\_show\_database](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_skip_show_database)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--skip-show-database** |
| **System Variable** | [**skip\_show\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_show_database) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This prevents people from using the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-databases) statement if they do not have the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_show-databases) privilege. This can improve security if you have concerns about users being able to see databases belonging to other users. Its effect depends on the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_show-databases) privilege: If the variable value is **ON**, the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-databases) statement is permitted only to users who have the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_show-databases) privilege, and the statement displays all database names. If the value is **OFF**, [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-databases) is permitted to all users, but displays the names of only those databases for which the user has the [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_show-databases) or other privilege.
* **Caution**
* Because any static global privilege is considered a privilege for all databases, any static global privilege enables a user to see all database names with [**SHOW DATABASES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-databases) or by examining the [**SCHEMATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-schemata-table) table of **INFORMATION\_SCHEMA**, except databases that have been restricted at the database level by partial revokes.

* **[slow\_launch\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_slow_launch_time)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--slow-launch-time=#** |
| **System Variable** | [**slow\_launch\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_launch_time) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **2** |

* If creating a thread takes longer than this many seconds, the server increments the [**Slow\_launch\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Slow_launch_threads) status variable.

* **[slow\_query\_log](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_slow_query_log)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--slow-query-log[={OFF|ON}]** |
| **System Variable** | [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the slow query log is enabled. The value can be 0 (or **OFF**) to disable the log or 1 (or **ON**) to enable the log. The destination for log output is controlled by the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable; if that value is **NONE**, no log entries are written even if the log is enabled.
* “Slow” is determined by the value of the [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) variable. See [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log).

* **[slow\_query\_log\_file](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_slow_query_log_file)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--slow-query-log-file=file\_name** |
| **System Variable** | [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **host\_name-slow.log** |

* The name of the slow query log file. The default value is ***host\_name***-slow.log, but the initial value can be changed with the **--slow\_query\_log\_file** option.

* **[socket](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_socket)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--socket={file\_name|pipe\_name}** |
| **System Variable** | [**socket**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_socket) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value (Windows)** | **MySQL** |
| **Default Value (Other)** | **/tmp/mysql.sock** |

* On Unix platforms, this variable is the name of the socket file that is used for local client connections. The default is /tmp/mysql.sock. (For some distribution formats, the directory might be different, such as /var/lib/mysql for RPMs.)
* On Windows, this variable is the name of the named pipe that is used for local client connections. The default value is **MySQL** (not case-sensitive).

* **[sort\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sort_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sort-buffer-size=#** |
| **System Variable** | [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **262144** |
| **Minimum Value** | **32768** |
| **Maximum Value (Windows)** | **4294967295** |
| **Maximum Value (Other, 64-bit platforms)** | **18446744073709551615** |
| **Maximum Value (Other, 32-bit platforms)** | **4294967295** |

* Each session that must perform a sort allocates a buffer of this size. [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) is not specific to any storage engine and applies in a general manner for optimization. At minimum the [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) value must be large enough to accommodate fifteen tuples in the sort buffer. Also, increasing the value of [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) may require increasing the value of [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size). For more information, see [Section 8.2.1.16, “ORDER BY Optimization”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#order-by-optimization)
* If you see many [**Sort\_merge\_passes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_merge_passes) per second in [**SHOW GLOBAL STATUS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-status) output, you can consider increasing the [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) value to speed up **ORDER BY** or **GROUP BY** operations that cannot be improved with query optimization or improved indexing.
* The optimizer tries to work out how much space is needed but can allocate more, up to the limit. Setting it larger than required globally slows down most queries that perform sorts. It is best to increase it as a session setting, and only for the sessions that need a larger size. On Linux, there are thresholds of 256KB and 2MB where larger values may significantly slow down memory allocation, so you should consider staying below one of those values. Experiment to find the best value for your workload. See [Section B.3.3.5, “Where MySQL Stores Temporary Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#temporary-files).
* The maximum permissible setting for [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) is 4GB−1. Larger values are permitted for 64-bit platforms (except 64-bit Windows, for which large values are truncated to 4GB−1 with a warning).

* **[sql\_auto\_is\_null](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_auto_is_null)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If this variable is enabled, then after a statement that successfully inserts an automatically generated **AUTO\_INCREMENT** value, you can find that value by issuing a statement of the following form:
* SELECT \* FROM ***tbl\_name*** WHERE ***auto\_col*** IS NULL
* If the statement returns a row, the value returned is the same as if you invoked the [**LAST\_INSERT\_ID()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_last-insert-id) function. For details, including the return value after a multiple-row insert, see [Section 12.16, “Information Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#information-functions). If no **AUTO\_INCREMENT** value was successfully inserted, the [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statement returns no row.
* The behavior of retrieving an **AUTO\_INCREMENT** value by using an [**IS NULL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_is-null) comparison is used by some ODBC programs, such as Access. See [Obtaining Auto-Increment Values](https://dev.mysql.com/doc/connector-odbc/en/connector-odbc-usagenotes-functionality-last-insert-id.html). This behavior can be disabled by setting [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null) to **OFF**.
* Prior to MySQL 8.0.16, the transformation of **WHERE *auto\_col* IS NULL** to **WHERE *auto\_col* = LAST\_INSERT\_ID()** was performed only when the statement was executed, so that the value of **sql\_auto\_is\_null** during execution determined whether the query was transformed. In MySQL 8.0.16 and later, the transformation is performed during statement preparation.
* The default value of [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null) is **OFF**.

* **[sql\_big\_selects](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_big_selects)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **ON** |

* If set to **OFF**, MySQL aborts [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements that are likely to take a very long time to execute (that is, statements for which the optimizer estimates that the number of examined rows exceeds the value of [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size)). This is useful when an inadvisable **WHERE** statement has been issued. The default value for a new connection is **ON**, which permits all [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements.
* If you set the [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) system variable to a value other than **DEFAULT**, [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) is set to **OFF**.

* **[sql\_buffer\_result](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_buffer_result)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_buffer\_result**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_buffer_result) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If enabled, [**sql\_buffer\_result**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_buffer_result) forces results from [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements to be put into temporary tables. This helps MySQL free the table locks early and can be beneficial in cases where it takes a long time to send results to the client. The default value is **OFF**.

* **[sql\_log\_off](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_log_off)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF** (enable logging)  **ON** (disable logging) |

* This variable controls whether logging to the general query log is disabled for the current session (assuming that the general query log itself is enabled). The default value is **OFF** (that is, enable logging). To disable or enable general query logging for the current session, set the session [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) variable to **ON** or **OFF**.
* Setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

* **[sql\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_mode)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sql-mode=name** |
| **System Variable** | [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Set |
| **Default Value** | **ONLY\_FULL\_GROUP\_BY STRICT\_TRANS\_TABLES NO\_ZERO\_IN\_DATE NO\_ZERO\_DATE ERROR\_FOR\_DIVISION\_BY\_ZERO NO\_ENGINE\_SUBSTITUTION** |
| **Valid Values** | **ALLOW\_INVALID\_DATES**  **ANSI\_QUOTES**  **ERROR\_FOR\_DIVISION\_BY\_ZERO**  **HIGH\_NOT\_PRECEDENCE**  **IGNORE\_SPACE**  **NO\_AUTO\_VALUE\_ON\_ZERO**  **NO\_BACKSLASH\_ESCAPES**  **NO\_DIR\_IN\_CREATE**  **NO\_ENGINE\_SUBSTITUTION**  **NO\_UNSIGNED\_SUBTRACTION**  **NO\_ZERO\_DATE**  **NO\_ZERO\_IN\_DATE**  **ONLY\_FULL\_GROUP\_BY**  **PAD\_CHAR\_TO\_FULL\_LENGTH**  **PIPES\_AS\_CONCAT**  **REAL\_AS\_FLOAT**  **STRICT\_ALL\_TABLES**  **STRICT\_TRANS\_TABLES**  **TIME\_TRUNCATE\_FRACTIONAL** |

* The current server SQL mode, which can be set dynamically. For details, see [Section 5.1.11, “Server SQL Modes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode).
* **Note**
* MySQL installation programs may configure the SQL mode during the installation process.
* If the SQL mode differs from the default or from what you expect, check for a setting in an option file that the server reads at startup.

* **[sql\_notes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_notes)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_notes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_notes) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* If enabled (the default), diagnostics of **Note** level increment **warning\_count** and the server records them. If disabled, **Note** diagnostics do not increment [**warning\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_warning_count) and the server does not record them. [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) includes output to disable this variable so that reloading the dump file does not produce warnings for events that do not affect the integrity of the reload operation.

* **[sql\_quote\_show\_create](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_quote_show_create)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_quote\_show\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_quote_show_create) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* If enabled (the default), the server quotes identifiers for [**SHOW CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table) and [**SHOW CREATE DATABASE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-database) statements. If disabled, quoting is disabled. This option is enabled by default so that replication works for identifiers that require quoting. See [Section 13.7.7.10, “SHOW CREATE TABLE Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-table), and [Section 13.7.7.6, “SHOW CREATE DATABASE Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-create-database).

* **[sql\_require\_primary\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_require_primary_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--sql-require-primary-key[={OFF|ON}]** |
| **Introduced** | 8.0.13 |
| **System Variable** | [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether statements that create new tables or alter the structure of existing tables enforce the requirement that tables have a primary key.
* Setting the session value of this system variable is a restricted operation. The session user must have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).
* Enabling this variable helps avoid performance problems in row-based replication that can occur when tables have no primary key. Suppose that a table has no primary key and an update or delete modifies multiple rows. On the replication source server, this operation can be performed using a single table scan but, when replicated using row-based replication, results in a table scan for each row to be modified on the replica. With a primary key, these table scans do not occur.
* [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) applies to both base tables and **TEMPORARY** tables, and changes to its value are replicated to replica servers. As of MySQL 8.0.18, it applies only to storage engines that can participate in replication.
* When enabled, [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) has these effects:
  + Attempts to create a new table with no primary key fail with an error. This includes **CREATE TABLE ... LIKE**. It also includes **CREATE TABLE ... SELECT**, unless the **CREATE TABLE** part includes a primary key definition.
  + Attempts to drop the primary key from an existing table fail with an error, with the exception that dropping the primary key and adding a primary key in the same **ALTER TABLE** statement is permitted.

Dropping the primary key fails even if the table also contains a **UNIQUE NOT NULL** index.

* + Attempts to import a table with no primary key fail with an error.

The **REQUIRE\_TABLE\_PRIMARY\_KEY\_CHECK** option of the [**CHANGE REPLICATION SOURCE TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-replication-source-to) statement (from MySQL 8.0.23) or [**CHANGE MASTER TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-master-to) statement (before MySQL 8.0.23) enables a replica to select its own policy for primary key checks. When the option is set to **ON** for a replication channel, the replica always uses the value **ON** for the [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) system variable in replication operations, requiring a primary key. When the option is set to **OFF**, the replica always uses the value **OFF** for the [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) system variable in replication operations, so that a primary key is never required, even if the source required one. When the **REQUIRE\_TABLE\_PRIMARY\_KEY\_CHECK** option is set to **STREAM**, which is the default, the replica uses whatever value is replicated from the source for each transaction. With the **STREAM** setting for the **REQUIRE\_TABLE\_PRIMARY\_KEY\_CHECK** option, if privilege checks are in use for the replication channel, the **PRIVILEGE\_CHECKS\_USER** account needs privileges sufficient to set restricted session variables, so that it can set the session value for the [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) system variable. With the **ON** or **OFF** settings, the account does not need these privileges. For more information, see [Section 17.3.3, “Replication Privilege Checks”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-privilege-checks).

* **[sql\_safe\_updates](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_safe_updates)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_safe\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_safe_updates) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If this variable is enabled, [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) and [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) statements that do not use a key in the **WHERE** clause or a **LIMIT** clause produce an error. This makes it possible to catch [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) and [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) statements where keys are not used properly and that would probably change or delete a large number of rows. The default value is **OFF**.
* For the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) client, [**sql\_safe\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_safe_updates) can be enabled by using the [--safe-updates](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysql_safe-updates) option. For more information, see [Using Safe-Updates Mode (--safe-updates)](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#safe-updates).

* **[sql\_select\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_select_limit)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_select\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_select_limit) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |

* The maximum number of rows to return from [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements. For more information, see [Using Safe-Updates Mode (--safe-updates)](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#safe-updates).
* The default value for a new connection is the maximum number of rows that the server permits per table. Typical default values are (232)−1 or (264)−1. If you have changed the limit, the default value can be restored by assigning a value of **DEFAULT**.
* If a [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) has a **LIMIT** clause, the **LIMIT** takes precedence over the value of [**sql\_select\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_select_limit).

* **[sql\_warnings](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_sql_warnings)**

|  |  |
| --- | --- |
| **System Variable** | [**sql\_warnings**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_warnings) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* This variable controls whether single-row [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) statements produce an information string if warnings occur. The default is **OFF**. Set the value to **ON** to produce an information string.

* **[ssl\_ca](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_ca)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-ca=file\_name** |
| **System Variable** | [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The path name of the Certificate Authority (CA) certificate file in PEM format. The file contains a list of trusted SSL Certificate Authorities.
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[ssl\_capath](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_capath)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-capath=dir\_name** |
| **System Variable** | [**ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_capath) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **NULL** |

* The path name of the directory that contains trusted SSL Certificate Authority (CA) certificate files in PEM format.
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[ssl\_cert](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_cert)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-cert=file\_name** |
| **System Variable** | [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The path name of the server SSL public key certificate file in PEM format.
* If the server is started with [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) set to a certificate that uses any restricted cipher or cipher category, the server starts with support for encrypted connections disabled. For information about cipher restrictions, see [Connection Cipher Configuration](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-cipher-configuration).
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[ssl\_cipher](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_cipher)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-cipher=name** |
| **System Variable** | [**ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cipher) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **NULL** |

* The list of permissible encryption ciphers for connections that use TLS protocols up through TLSv1.2. If no cipher in the list is supported, encrypted connections that use these TLS protocols do not work.
* For greatest portability, the cipher list should be a list of one or more cipher names, separated by colons. Examples:
* [mysqld]
* ssl\_cipher="AES128-SHA"
* ssl\_cipher="DHE-RSA-AES128-GCM-SHA256:AES128-SHA"
* OpenSSL supports the syntax for specifying ciphers described in the OpenSSL documentation at <https://www.openssl.org/docs/manmaster/man1/ciphers.html>.
* For information about which encryption ciphers MySQL supports, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-protocols-ciphers).
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[ssl\_crl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_crl)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-crl=file\_name** |
| **System Variable** | [**ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crl) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The path name of the file containing certificate revocation lists in PEM format.
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[ssl\_crlpath](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_crlpath)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-crlpath=dir\_name** |
| **System Variable** | [**ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crlpath) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **NULL** |

* The path of the directory that contains certificate revocation-list files in PEM format.
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[ssl\_fips\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_fips_mode)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-fips-mode={OFF|ON|STRICT}** |
| **System Variable** | [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **OFF** |
| **Valid Values** | **OFF** (or 0)  **ON** (or 1)  **STRICT** (or 2) |

* Controls whether to enable FIPS mode on the server side. The [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) system variable differs from other **ssl\_*xxx*** system variables in that it is not used to control whether the server permits encrypted connections, but rather to affect which cryptographic operations are permitted. See [Section 6.8, “FIPS Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#fips-mode).
* These [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) values are permitted:
  + **OFF** (or 0): Disable FIPS mode.
  + **ON** (or 1): Enable FIPS mode.
  + **STRICT** (or 2): Enable “strict” FIPS mode.

**Note**

If the OpenSSL FIPS Object Module is not available, the only permitted value for [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) is **OFF**. In this case, setting [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) to **ON** or **STRICT** at startup causes the server to produce an error message and exit.

* **[ssl\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_ssl_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--ssl-key=file\_name** |
| **System Variable** | [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **NULL** |

* The path name of the server SSL private key file in PEM format. For better security, use a certificate with an RSA key size of at least 2048 bits.
* If the key file is protected by a passphrase, the server prompts the user for the passphrase. The password must be given interactively; it cannot be stored in a file. If the passphrase is incorrect, the program continues as if it could not read the key.
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.

* **[stored\_program\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_stored_program_cache)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--stored-program-cache=#** |
| **System Variable** | [**stored\_program\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_cache) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **256** |
| **Minimum Value** | **16** |
| **Maximum Value** | **524288** |

* Sets a soft upper limit for the number of cached stored routines per connection. The value of this variable is specified in terms of the number of stored routines held in each of the two caches maintained by the MySQL Server for, respectively, stored procedures and stored functions.
* Whenever a stored routine is executed this cache size is checked before the first or top-level statement in the routine is parsed; if the number of routines of the same type (stored procedures or stored functions according to which is being executed) exceeds the limit specified by this variable, the corresponding cache is flushed and memory previously allocated for cached objects is freed. This allows the cache to be flushed safely, even when there are dependencies between stored routines.
* The stored procedure and stored function caches exists in parallel with the stored program definition cache partition of the [dictionary object cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dictionary_object_cache). The stored procedure and stored function caches are per connection, while the stored program definition cache is shared. The existence of objects in the stored procedure and stored function caches have no dependence on the existence of objects in the stored program definition cache, and vice versa. For more information, see [Section 14.4, “Dictionary Object Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-dictionary.html#data-dictionary-object-cache).

* **[stored\_program\_definition\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_stored_program_definition_cache)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--stored-program-definition-cache=#** |
| **System Variable** | [**stored\_program\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_definition_cache) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **256** |
| **Minimum Value** | **256** |
| **Maximum Value** | **524288** |

* Defines a limit for the number of stored program definition objects, both used and unused, that can be kept in the dictionary object cache.
* Unused stored program definition objects are only kept in the dictionary object cache when the number in use is less than the capacity defined by **stored\_program\_definition\_cache**.
* A setting of 0 means that stored program definition objects are only kept in the dictionary object cache while they are in use.
* The stored program definition cache partition exists in parallel with the stored procedure and stored function caches that are configured using the [**stored\_program\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_cache) option.
* The [**stored\_program\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_cache) option sets a soft upper limit for the number of cached stored procedures or functions per connection, and the limit is checked each time a connection executes a stored procedure or function. The stored program definition cache partition, on the other hand, is a shared cache that stores stored program definition objects for other purposes. The existence of objects in the stored program definition cache partition has no dependence on the existence of objects in the stored procedure cache or stored function cache, and vice versa.
* For related information, see [Section 14.4, “Dictionary Object Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-dictionary.html#data-dictionary-object-cache).

* **[super\_read\_only](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_super_read_only)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--super-read-only[={OFF|ON}]** |
| **System Variable** | [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* If the [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) system variable is enabled, the server permits no client updates except from users who have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege). If the [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) system variable is also enabled, the server prohibits client updates even from users who have [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super). See the description of the [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) system variable for a description of read-only mode and information about how [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) and [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) interact.
* Client updates prevented when [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) is enabled include operations that do not necessarily appear to be updates, such as **CREATE FUNCTION** (to install a loadable function), **INSTALL PLUGIN**, and **INSTALL COMPONENT**. These operations are prohibited because they involve changes to tables in the **mysql** system schema.
* Changes to [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) on a replication source server are not replicated to replica servers. The value can be set on a replica independent of the setting on the source.

* **[syseventlog.facility](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_syseventlog.facility)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--syseventlog.facility=value** |
| **Introduced** | 8.0.13 |
| **System Variable** | [**syseventlog.facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.facility) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **daemon** |

* The facility for error log output written to **syslog** (what type of program is sending the message). This variable is unavailable unless the **log\_sink\_syseventlog** error log component is installed. See [Section 5.4.2.8, “Error Logging to the System Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog).
* The permitted values can vary per operating system; consult your system **syslog** documentation.
* This variable does not exist on Windows.

* **[syseventlog.include\_pid](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_syseventlog.include_pid)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--syseventlog.include-pid[={OFF|ON}]** |
| **Introduced** | 8.0.13 |
| **System Variable** | [**syseventlog.include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.include_pid) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Whether to include the server process ID in each line of error log output written to **syslog**. This variable is unavailable unless the **log\_sink\_syseventlog** error log component is installed. See [Section 5.4.2.8, “Error Logging to the System Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog).
* This variable does not exist on Windows.

* **[syseventlog.tag](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_syseventlog.tag)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--syseventlog.tag=tag** |
| **Introduced** | 8.0.13 |
| **System Variable** | [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **empty string** |

* The tag to be added to the server identifier in error log output written to **syslog** or the Windows Event Log. This variable is unavailable unless the **log\_sink\_syseventlog** error log component is installed. See [Section 5.4.2.8, “Error Logging to the System Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog).
* By default, no tag is set, so the server identifier is simply **MySQL** on Windows, and **mysqld** on other platforms. If a tag value of ***tag*** is specified, it is appended to the server identifier with a leading hyphen, resulting in a **syslog** identifier of **mysqld-*tag*** (or **MySQL-*tag*** on Windows).
* On Windows, to use a tag that does not already exist, the server must be run from an account with Administrator privileges, to permit creation of a registry entry for the tag. Elevated privileges are not required if the tag already exists.

* **[system\_time\_zone](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_system_time_zone)**

|  |  |
| --- | --- |
| **System Variable** | [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The server system time zone. When the server begins executing, it inherits a time zone setting from the machine defaults, possibly modified by the environment of the account used for running the server or the startup script. The value is used to set [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone). Typically the time zone is specified by the **TZ** environment variable. It also can be specified using the [--timezone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqld_safe_timezone) option of the [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) script.
* The [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone) variable differs from [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone). Although they might have the same value, the latter variable is used to initialize the time zone for each client that connects. See [Section 5.1.15, “MySQL Server Time Zone Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-support).

* **[table\_definition\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_table_definition_cache)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--table-definition-cache=#** |
| **System Variable** | [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **-1** (signifies autosizing; do not assign this literal value) |
| **Minimum Value** | **400** |
| **Maximum Value** | **524288** |

* The number of table definitions that can be stored in the definition cache. If you use a large number of tables, you can create a large table definition cache to speed up opening of tables. The table definition cache takes less space and does not use file descriptors, unlike the normal table cache. The minimum value is 400. The default value is based on the following formula, capped to a limit of 2000:
* MIN(400 + table\_open\_cache / 2, 2000)
* For [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html), [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) acts as a soft limit for the number of open table instances in the **InnoDB** data dictionary cache. If the number of open table instances exceeds the [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) setting, the LRU mechanism begins to mark table instances for eviction and eventually removes them from the data dictionary cache. The limit helps address situations in which significant amounts of memory would be used to cache rarely used table instances until the next server restart. The number of table instances with cached metadata could be higher than the limit defined by [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache), because parent and child table instances with foreign key relationships are not placed on the LRU list and are not subject to eviction from memory.
* Additionally, [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) defines a soft limit for the number of [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html) file-per-table tablespaces that can be open at one time, which is also controlled by [**innodb\_open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_open_files). If both [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) and [**innodb\_open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_open_files) are set, the highest setting is used. If neither variable is set, [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache), which has a higher default value, is used. If the number of open tablespace file handles exceeds the limit defined by [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) or [**innodb\_open\_files**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_open_files), the LRU mechanism searches the tablespace file LRU list for files that are fully flushed and are not currently being extended. This process is performed each time a new tablespace is opened. If there are no “inactive” tablespaces, no tablespace files are closed.
* The table definition cache exists in parallel with the table definition cache partition of the [dictionary object cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dictionary_object_cache). Both caches store table definitions but serve different parts of the MySQL server. Objects in one cache have no dependence on the existence objects in the other. For more information, see [Section 14.4, “Dictionary Object Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-dictionary.html#data-dictionary-object-cache).

* **[table\_encryption\_privilege\_check](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_table_encryption_privilege_check)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--table-encryption-privilege-check[={OFF|ON}]** |
| **Introduced** | 8.0.16 |
| **System Variable** | [**table\_encryption\_privilege\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_encryption_privilege_check) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Controls the [**TABLE\_ENCRYPTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_table-encryption-admin) privilege check that occurs when creating or altering a schema or general tablespace with encryption that differs from the [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) setting, or when creating or altering a table with an encryption setting that differs from the default schema encryption. The check is disabled by default.
* Setting [**table\_encryption\_privilege\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_encryption_privilege_check) at runtime requires the [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege.
* [**table\_encryption\_privilege\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_encryption_privilege_check) supports [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) and [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax. See [Section 5.1.9.3, “Persisted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables).
* For more information, see [Defining an Encryption Default for Schemas and General Tablespaces](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-schema-tablespace-encryption-default).

* **[table\_open\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_table_open_cache)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--table-open-cache=#** |
| **System Variable** | [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **4000** |
| **Minimum Value** | **1** |
| **Maximum Value** | **524288** |

* The number of open tables for all threads. Increasing this value increases the number of file descriptors that [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) requires. You can check whether you need to increase the table cache by checking the [**Opened\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_tables) status variable. See [Section 5.1.10, “Server Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-status-variables). If the value of [**Opened\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_tables) is large and you do not use [**FLUSH TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables) often (which just forces all tables to be closed and reopened), then you should increase the value of the [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) variable. For more information about the table cache, see [Section 8.4.3.1, “How MySQL Opens and Closes Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#table-cache).

* **[table\_open\_cache\_instances](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_table_open_cache_instances)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--table-open-cache-instances=#** |
| **System Variable** | [**table\_open\_cache\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache_instances) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **16** |
| **Minimum Value** | **1** |
| **Maximum Value** | **64** |

* The number of open tables cache instances. To improve scalability by reducing contention among sessions, the open tables cache can be partitioned into several smaller cache instances of size [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) / [**table\_open\_cache\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache_instances) . A session needs to lock only one instance to access it for DML statements. This segments cache access among instances, permitting higher performance for operations that use the cache when there are many sessions accessing tables. (DDL statements still require a lock on the entire cache, but such statements are much less frequent than DML statements.)
* A value of 8 or 16 is recommended on systems that routinely use 16 or more cores.

* **[tablespace\_definition\_cache](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_tablespace_definition_cache)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--tablespace-definition-cache=#** |
| **System Variable** | [**tablespace\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tablespace_definition_cache) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **256** |
| **Minimum Value** | **256** |
| **Maximum Value** | **524288** |

* Defines a limit for the number of tablespace definition objects, both used and unused, that can be kept in the dictionary object cache.
* Unused tablespace definition objects are only kept in the dictionary object cache when the number in use is less than the capacity defined by **tablespace\_definition\_cache**.
* A setting of **0** means that tablespace definition objects are only kept in the dictionary object cache while they are in use.
* For more information, see [Section 14.4, “Dictionary Object Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-dictionary.html#data-dictionary-object-cache).

* **[temptable\_max\_mmap](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_temptable_max_mmap)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--temptable-max-mmap=#** |
| **Introduced** | 8.0.23 |
| **System Variable** | [**temptable\_max\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_mmap) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1073741824** |
| **Minimum Value** | **0** |
| **Maximum Value** | **2^64-1** |

* Defines the maximum amount of memory (in bytes) the TempTable storage engine is permitted to allocate from memory-mapped temporary files before it starts storing data to **InnoDB** internal temporary tables on disk. A setting of 0 disables allocation of memory from memory-mapped temporary files. For more information, see [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

* **[temptable\_max\_ram](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_temptable_max_ram)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--temptable-max-ram=#** |
| **System Variable** | [**temptable\_max\_ram**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_ram) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1073741824** |
| **Minimum Value** | **2097152** |
| **Maximum Value** | **2^64-1** |

* Defines the maximum amount of memory that can be occupied by the **TempTable** storage engine before it starts storing data on disk. The default value is 1073741824 bytes (1GiB). For more information, see [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

* **[temptable\_use\_mmap](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_temptable_use_mmap)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--temptable-use-mmap[={OFF|ON}]** |
| **Introduced** | 8.0.16 |
| **Deprecated** | 8.0.26 |
| **System Variable** | [**temptable\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_use_mmap) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Defines whether the TempTable storage engine allocates space for internal in-memory temporary tables as memory-mapped temporary files when the amount of memory occupied by the TempTable storage engine exceeds the limit defined by the [**temptable\_max\_ram**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_ram) variable. When [**temptable\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_use_mmap) is disabled, the TempTable storage engine uses **InnoDB** on-disk internal temporary tables instead. For more information, see [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

* **[thread\_cache\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_cache_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-cache-size=#** |
| **System Variable** | [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **-1** (signifies autosizing; do not assign this literal value) |
| **Minimum Value** | **0** |
| **Maximum Value** | **16384** |

* How many threads the server should cache for reuse. When a client disconnects, the client's threads are put in the cache if there are fewer than [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) threads there. Requests for threads are satisfied by reusing threads taken from the cache if possible, and only when the cache is empty is a new thread created. This variable can be increased to improve performance if you have a lot of new connections. Normally, this does not provide a notable performance improvement if you have a good thread implementation. However, if your server sees hundreds of connections per second you should normally set [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) high enough so that most new connections use cached threads. By examining the difference between the [**Connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connections) and [**Threads\_created**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_created) status variables, you can see how efficient the thread cache is. For details, see [Section 5.1.10, “Server Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-status-variables).
* The default value is based on the following formula, capped to a limit of 100:
* 8 + (max\_connections / 100)

* **[thread\_handling](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_handling)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-handling=name** |
| **System Variable** | [**thread\_handling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_handling) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **one-thread-per-connection** |
| **Valid Values** | **no-threads**  **one-thread-per-connection**  **loaded-dynamically** |

* The thread-handling model used by the server for connection threads. The permissible values are **no-threads** (the server uses a single thread to handle one connection), **one-thread-per-connection** (the server uses one thread to handle each client connection), and **loaded-dynamically** (set by the thread pool plugin when it initializes). **no-threads** is useful for debugging under Linux; see [Section 5.9, “Debugging MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#debugging-mysql).

* **[thread\_pool\_algorithm](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_algorithm)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-algorithm=#** |
| **System Variable** | [**thread\_pool\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_algorithm) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1** |

* This variable controls which algorithm the thread pool plugin uses:
  + A value of 0 (the default) uses a conservative low-concurrency algorithm which is most well tested and is known to produce very good results.
  + A value of 1 increases the concurrency and uses a more aggressive algorithm which at times has been known to perform 5–10% better on optimal thread counts, but has degrading performance as the number of connections increases. Its use should be considered as experimental and not supported.

This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_pool\_high\_priority\_connection](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_high_priority_connection)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-high-priority-connection=#** |
| **System Variable** | [**thread\_pool\_high\_priority\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_high_priority_connection) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1** |

* This variable affects queuing of new statements prior to execution. If the value is 0 (false, the default), statement queuing uses both the low-priority and high-priority queues. If the value is 1 (true), queued statements always go to the high-priority queue.
* This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_pool\_max\_active\_query\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_max_active_query_threads)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-max-active-query-threads** |
| **Introduced** | 8.0.19 |
| **System Variable** | [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **512** |

* The maximum permissible number of active (running) query threads per group. If the value is 0, the thread pool plugin uses up to as many threads as are available.
* This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_pool\_max\_unused\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_max_unused_threads)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-max-unused-threads=#** |
| **System Variable** | [**thread\_pool\_max\_unused\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_unused_threads) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4096** |

* The maximum permitted number of unused threads in the thread pool. This variable makes it possible to limit the amount of memory used by sleeping threads.
* A value of 0 (the default) means no limit on the number of sleeping threads. A value of ***N*** where ***N*** is greater than 0 means 1 consumer thread and ***N***−1 reserve threads. In this case, if a thread is ready to sleep but the number of sleeping threads is already at the maximum, the thread exits rather than going to sleep.
* A sleeping thread is either sleeping as a consumer thread or a reserve thread. The thread pool permits one thread to be the consumer thread when sleeping. If a thread goes to sleep and there is no existing consumer thread, it sleeps as a consumer thread. When a thread must be woken up, a consumer thread is selected if there is one. A reserve thread is selected only when there is no consumer thread to wake up.
* This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_pool\_prio\_kickup\_timer](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_prio_kickup_timer)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-prio-kickup-timer=#** |
| **System Variable** | [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **1000** |
| **Minimum Value** | **0** |
| **Maximum Value** | **4294967294** |

* This variable affects statements waiting for execution in the low-priority queue. The value is the number of milliseconds before a waiting statement is moved to the high-priority queue. The default is 1000 (1 second).
* This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_pool\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-size=#** |
| **System Variable** | [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **16** |
| **Minimum Value** | **1** |
| **Maximum Value (≥ 8.0.19)** | **512** |
| **Maximum Value (≤ 8.0.18)** | **64** |

* The number of thread groups in the thread pool. This is the most important parameter controlling thread pool performance. It affects how many statements can execute simultaneously. If a value outside the range of permissible values is specified, the thread pool plugin does not load and the server writes a message to the error log.
* This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_pool\_stall\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_pool_stall_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-pool-stall-limit=#** |
| **System Variable** | [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **6** |
| **Minimum Value** | **4** |
| **Maximum Value** | **600** |

* This variable affects executing statements. The value is the amount of time a statement has to finish after starting to execute before it becomes defined as stalled, at which point the thread pool permits the thread group to begin executing another statement. The value is measured in 10 millisecond units, so the default of 6 means 60ms. Short wait values permit threads to start more quickly. Short values are also better for avoiding deadlock situations. Long wait values are useful for workloads that include long-running statements, to avoid starting too many new statements while the current ones execute.
* This variable is available only if the thread pool plugin is enabled. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

* **[thread\_stack](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_thread_stack)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--thread-stack=#** |
| **System Variable** | [**thread\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_stack) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value (64-bit platforms)** | **286720** |
| **Default Value (32-bit platforms)** | **221184** |
| **Minimum Value** | **131072** |
| **Maximum Value (64-bit platforms)** | **18446744073709547520** |
| **Maximum Value (32-bit platforms)** | **4294967295** |
| **Block Size** | **1024** |

* The stack size for each thread. The default is large enough for normal operation. If the thread stack size is too small, it limits the complexity of the SQL statements that the server can handle, the recursion depth of stored procedures, and other memory-consuming actions.

* **[time\_zone](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_time_zone)**

|  |  |
| --- | --- |
| **System Variable** | [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies (≥ 8.0.17)** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies (≤ 8.0.16)** | No |
| **Type** | String |
| **Default Value** | **SYSTEM** |
| **Minimum Value (≥ 8.0.19)** | **-13:59** |
| **Minimum Value (≤ 8.0.18)** | **-12:59** |
| **Maximum Value (≥ 8.0.19)** | **+14:00** |
| **Maximum Value (≤ 8.0.18)** | **+13:00** |

* The current time zone. This variable is used to initialize the time zone for each client that connects. By default, the initial value of this is **'SYSTEM'** (which means, “use the value of [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone)”). The value can be specified explicitly at server startup with the [--default-time-zone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_default-time-zone) option. See [Section 5.1.15, “MySQL Server Time Zone Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-support).
* **Note**
* If set to **SYSTEM**, every MySQL function call that requires a time zone calculation makes a system library call to determine the current system time zone. This call may be protected by a global mutex, resulting in contention.

* **[timestamp](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_timestamp)**

|  |  |
| --- | --- |
| **System Variable** | [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Numeric |
| **Default Value** | **UNIX\_TIMESTAMP()** |
| **Minimum Value** | **1** |
| **Maximum Value** | **2147483647** |

* Set the time for this client. This is used to get the original timestamp if you use the binary log to restore rows. ***timestamp\_value*** should be a Unix epoch timestamp (a value like that returned by [**UNIX\_TIMESTAMP()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_unix-timestamp), not a value in **'*YYYY-MM-DD hh:mm:ss*'** format) or **DEFAULT**.
* Setting [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) to a constant value causes it to retain that value until it is changed again. Setting [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) to **DEFAULT** causes its value to be the current date and time as of the time it is accessed.
* [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) is a **DOUBLE** rather than **BIGINT** because its value includes a microseconds part. The maximum value corresponds to **'2038-01-19 03:14:07'** UTC, the same as for the [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) data type.
* **SET timestamp** affects the value returned by [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now) but not by [**SYSDATE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_sysdate). This means that timestamp settings in the binary log have no effect on invocations of [**SYSDATE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_sysdate). The server can be started with the [--sysdate-is-now](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sysdate-is-now) option to cause [**SYSDATE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_sysdate) to be a synonym for [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now), in which case **SET timestamp** affects both functions.

* **[tls\_ciphersuites](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_tls_ciphersuites)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--tls-ciphersuites=ciphersuite\_list** |
| **Introduced** | 8.0.16 |
| **System Variable** | [**tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_ciphersuites) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **NULL** |

* Which ciphersuites the server permits for encrypted connections that use TLSv1.3. The value is a list of zero or more colon-separated ciphersuite names.
* The ciphersuites that can be named for this variable depend on the SSL library used to compile MySQL. If this variable is not set, its default value is **NULL**, which means that the server permits the default set of ciphersuites. If the variable is set to the empty string, no ciphersuites are enabled and encrypted connections cannot be established. For more information, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-protocols-ciphers).

* **[tls\_version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_tls_version)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--tls-version=protocol\_list** |
| **System Variable** | [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version) |
| **Scope** | Global |
| **Dynamic (≥ 8.0.16)** | Yes |
| **Dynamic (≤ 8.0.15)** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value (≥ 8.0.16)** | **TLSv1,TLSv1.1,TLSv1.2,TLSv1.3** (OpenSSL 1.1.1 and higher)  **TLSv1,TLSv1.1,TLSv1.2** (otherwise) |
| **Default Value (≤ 8.0.15)** | **TLSv1,TLSv1.1,TLSv1.2** |

* Which protocols the server permits for encrypted connections. The value is a list of one or more comma-separated protocol names. The protocols that can be named for this variable depend on the SSL library used to compile MySQL. Permitted protocols should be chosen such as not to leave “holes” in the list. For details, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-protocols-ciphers).
* As of MySQL 8.0.16, this variable is dynamic and can be modified at runtime to affect the TSL context the server uses for new connections. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration). Prior to MySQL 8.0.16, this variable can be set only at server startup.
* **Note**
* As of MySQL 8.0.26, the TLSv1 and TLSv1.1 connection protocols are deprecated and support for them is subject to removal in a future version of MySQL. See [Deprecated TLS Protocols](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-deprecated-protocols).

* **[tmp\_table\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_tmp_table_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--tmp-table-size=#** |
| **System Variable** | [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Integer |
| **Default Value** | **16777216** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **18446744073709551615** |

* The maximum size of internal in-memory temporary tables. This variable does not apply to user-created **MEMORY** tables.
* The actual limit is the smaller of [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) and [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size). When an in-memory temporary table exceeds the limit, MySQL automatically converts it to an on-disk temporary table.
* Increase the value of [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) (and [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size) if necessary) if you do many advanced **GROUP BY** queries and you have lots of memory.
* You can compare the number of internal on-disk temporary tables created to the total number of internal temporary tables created by comparing [**Created\_tmp\_disk\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) and [**Created\_tmp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) values.
* See also [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

* **[tmpdir](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_tmpdir)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--tmpdir=dir\_name** |
| **System Variable** | [**tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmpdir) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |

* The path of the directory to use for creating temporary files. It might be useful if your default **/tmp** directory resides on a partition that is too small to hold temporary tables. This variable can be set to a list of several paths that are used in round-robin fashion. Paths should be separated by colon characters (**:**) on Unix and semicolon characters (**;**) on Windows.
* [**tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmpdir) can be a non-permanent location, such as a directory on a memory-based file system or a directory that is cleared when the server host restarts. If the MySQL server is acting as a replica, and you are using a non-permanent location for [**tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmpdir), consider setting a different temporary directory for the replica using the [**slave\_load\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_load_tmpdir) variable. For a replica, the temporary files used to replicate [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data) statements are stored in this directory, so with a permanent location they can survive machine restarts, although replication can now continue after a restart if the temporary files have been removed.
* For more information about the storage location of temporary files, see [Section B.3.3.5, “Where MySQL Stores Temporary Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#temporary-files).

* **[transaction\_alloc\_block\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_transaction_alloc_block_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--transaction-alloc-block-size=#** |
| **System Variable** | [**transaction\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_alloc_block_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **8192** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **131072** |
| **Block Size** | **1024** |

* The amount in bytes by which to increase a per-transaction memory pool which needs memory. See the description of [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size).

* **[transaction\_isolation](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_transaction_isolation)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--transaction-isolation=name** |
| **System Variable** | [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Enumeration |
| **Default Value** | **REPEATABLE-READ** |
| **Valid Values** | **READ-UNCOMMITTED**  **READ-COMMITTED**  **REPEATABLE-READ**  **SERIALIZABLE** |

* The transaction isolation level. The default is [**REPEATABLE-READ**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_repeatable-read).
* The transaction isolation level has three scopes: global, session, and next transaction. This three-scope implementation leads to some nonstandard isolation-level assignment semantics, as described later.
* To set the global transaction isolation level at startup, use the [--transaction-isolation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_transaction-isolation) server option.
* At runtime, the isolation level can be set directly using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement to assign a value to the [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) system variable, or indirectly using the [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) statement. If you set [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) directly to an isolation level name that contains a space, the name should be enclosed within quotation marks, with the space replaced by a dash. For example, use this [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement to set the global value:
* SET GLOBAL transaction\_isolation = 'READ-COMMITTED';
* Setting the global [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) value sets the isolation level for all subsequent sessions. Existing sessions are unaffected.
* To set the session or next-level [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) value, use the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement. For most session system variables, these statements are equivalent ways to set the value:
* SET @@SESSION.***var\_name*** = ***value***;
* SET SESSION ***var\_name*** = ***value***;
* SET ***var\_name*** = ***value***;
* SET @@***var\_name*** = ***value***;
* As mentioned previously, the transaction isolation level has a next-transaction scope, in addition to the global and session scopes. To enable the next-transaction scope to be set, [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax for assigning session system variable values has nonstandard semantics for [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation):
  + To set the session isolation level, use any of these syntaxes:
  + SET @@SESSION.transaction\_isolation = ***value***;
  + SET SESSION transaction\_isolation = ***value***;
  + SET transaction\_isolation = ***value***;

For each of those syntaxes, these semantics apply:

* + - Sets the isolation level for all subsequent transactions performed within the session.
    - Permitted within transactions, but does not affect the current ongoing transaction.
    - If executed between transactions, overrides any preceding statement that sets the next-transaction isolation level.
    - Corresponds to [**SET SESSION TRANSACTION ISOLATION LEVEL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) (with the **SESSION** keyword).
  + To set the next-transaction isolation level, use this syntax:
  + SET @@transaction\_isolation = ***value***;

For that syntax, these semantics apply:

* + - Sets the isolation level only for the next single transaction performed within the session.
    - Subsequent transactions revert to the session isolation level.
    - Not permitted within transactions.
    - Corresponds to [**SET TRANSACTION ISOLATION LEVEL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) (without the **SESSION** keyword).

For more information about [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) and its relationship to the [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) system variable, see [Section 13.3.7, “SET TRANSACTION Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction).

* **[transaction\_prealloc\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_transaction_prealloc_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--transaction-prealloc-size=#** |
| **System Variable** | [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **4096** |
| **Minimum Value** | **1024** |
| **Maximum Value** | **131072** |
| **Block Size** | **1024** |

* There is a per-transaction memory pool from which various transaction-related allocations take memory. The initial size of the pool in bytes is [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size). For every allocation that cannot be satisfied from the pool because it has insufficient memory available, the pool is increased by [**transaction\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_alloc_block_size) bytes. When the transaction ends, the pool is truncated to [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size) bytes.
* By making [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size) sufficiently large to contain all statements within a single transaction, you can avoid many **malloc()** calls.

* **[transaction\_read\_only](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_transaction_read_only)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--transaction-read-only[={OFF|ON}]** |
| **System Variable** | [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* The transaction access mode. The value can be **OFF** (read/write; the default) or **ON** (read only).
* The transaction access mode has three scopes: global, session, and next transaction. This three-scope implementation leads to some nonstandard access-mode assignment semantics, as described later.
* To set the global transaction access mode at startup, use the [--transaction-read-only](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_transaction-read-only) server option.
* At runtime, the access mode can be set directly using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement to assign a value to the [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) system variable, or indirectly using the [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) statement. For example, use this [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement to set the global value:
* SET GLOBAL transaction\_read\_only = ON;
* Setting the global [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) value sets the access mode for all subsequent sessions. Existing sessions are unaffected.
* To set the session or next-level [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) value, use the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement. For most session system variables, these statements are equivalent ways to set the value:
* SET @@SESSION.***var\_name*** = ***value***;
* SET SESSION ***var\_name*** = ***value***;
* SET ***var\_name*** = ***value***;
* SET @@***var\_name*** = ***value***;
* As mentioned previously, the transaction access mode has a next-transaction scope, in addition to the global and session scopes. To enable the next-transaction scope to be set, [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax for assigning session system variable values has nonstandard semantics for [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only),
  + To set the session access mode, use any of these syntaxes:
  + SET @@SESSION.transaction\_read\_only = ***value***;
  + SET SESSION transaction\_read\_only = ***value***;
  + SET transaction\_read\_only = ***value***;

For each of those syntaxes, these semantics apply:

* + - Sets the access mode for all subsequent transactions performed within the session.
    - Permitted within transactions, but does not affect the current ongoing transaction.
    - If executed between transactions, overrides any preceding statement that sets the next-transaction access mode.
    - Corresponds to [**SET SESSION TRANSACTION {READ WRITE | READ ONLY}**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) (with the **SESSION** keyword).
  + To set the next-transaction access mode, use this syntax:
  + SET @@transaction\_read\_only = ***value***;

For that syntax, these semantics apply:

* + - Sets the access mode only for the next single transaction performed within the session.
    - Subsequent transactions revert to the session access mode.
    - Not permitted within transactions.
    - Corresponds to [**SET TRANSACTION {READ WRITE | READ ONLY}**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) (without the **SESSION** keyword).

For more information about [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) and its relationship to the [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) system variable, see [Section 13.3.7, “SET TRANSACTION Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction).

* **[unique\_checks](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_unique_checks)**

|  |  |
| --- | --- |
| **System Variable** | [**unique\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_unique_checks) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **ON** |

* If set to 1 (the default), uniqueness checks for secondary indexes in **InnoDB** tables are performed. If set to 0, storage engines are permitted to assume that duplicate keys are not present in input data. If you know for certain that your data does not contain uniqueness violations, you can set this to 0 to speed up large table imports to **InnoDB**.
* Setting this variable to 0 does not require storage engines to ignore duplicate keys. An engine is still permitted to check for them and issue duplicate-key errors if it detects them.

* **[updatable\_views\_with\_limit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_updatable_views_with_limit)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--updatable-views-with-limit[={OFF|ON}]** |
| **System Variable** | [**updatable\_views\_with\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_updatable_views_with_limit) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **1** |

* This variable controls whether updates to a view can be made when the view does not contain all columns of the primary key defined in the underlying table, if the update statement contains a **LIMIT** clause. (Such updates often are generated by GUI tools.) An update is an [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) or [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) statement. Primary key here means a **PRIMARY KEY**, or a **UNIQUE** index in which no column can contain **NULL**.
* The variable can have two values:
  + **1** or **YES**: Issue a warning only (not an error message). This is the default value.
  + **0** or **NO**: Prohibit the update.

* **[use\_secondary\_engine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_use_secondary_engine)**

|  |  |
| --- | --- |
| **Introduced** | 8.0.13 |
| **System Variable** | [**use\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_use_secondary_engine) |
| **Scope** | Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Enumeration |
| **Default Value** | **ON** |
| **Valid Values** | **OFF**  **ON**  **FORCED** |

* For future use.
* Whether to execute queries using a secondary engine.
* For use with HeatWave. See [HeatWave User Guide](https://dev.mysql.com/doc/heatwave/en/).
* **validate\_password.*xxx***

The **validate\_password** component implements a set of system variables having names of the form **validate\_password.*xxx***. These variables affect password testing by that component; see [Section 6.4.3.2, “Password Validation Options and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#validate-password-options-variables).

* **[version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version)**

The version number for the server. The value might also include a suffix indicating server build or configuration information. -debug indicates that the server was built with debugging support enabled.

* **[version\_comment](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version_comment)**

|  |  |
| --- | --- |
| **System Variable** | [**version\_comment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_comment) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The **CMake** configuration program has a [COMPILATION\_COMMENT\_SERVER](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_compilation_comment_server) option that permits a comment to be specified when building MySQL. This variable contains the value of that comment. (Prior to MySQL 8.0.14, [**version\_comment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_comment) is set by the [COMPILATION\_COMMENT](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_compilation_comment) option.) See [Section 2.9.7, “MySQL Source-Configuration Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#source-configuration-options).

* **[version\_compile\_machine](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version_compile_machine)**

|  |  |
| --- | --- |
| **System Variable** | [**version\_compile\_machine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_machine) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The type of the server binary.

* **[version\_compile\_os](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version_compile_os)**

|  |  |
| --- | --- |
| **System Variable** | [**version\_compile\_os**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_os) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The type of operating system on which MySQL was built.

* **[version\_compile\_zlib](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version_compile_zlib)**

|  |  |
| --- | --- |
| **System Variable** | [**version\_compile\_zlib**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_compile_zlib) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |

* The version of the compiled-in **zlib** library.

* **[wait\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_wait_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--wait-timeout=#** |
| **System Variable** | [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **28800** |
| **Minimum Value** | **1** |
| **Maximum Value (Windows)** | **2147483** |
| **Maximum Value (Other)** | **31536000** |

* The number of seconds the server waits for activity on a noninteractive connection before closing it.
* On thread startup, the session [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) value is initialized from the global [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) value or from the global [**interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_interactive_timeout) value, depending on the type of client (as defined by the **CLIENT\_INTERACTIVE** connect option to [**mysql\_real\_connect()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-real-connect.html)). See also [**interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_interactive_timeout).

* **[warning\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_warning_count)**

The number of errors, warnings, and notes that resulted from the last statement that generated messages. This variable is read only. See [Section 13.7.7.42, “SHOW WARNINGS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings).

* **[windowing\_use\_high\_precision](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_windowing_use_high_precision)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--windowing-use-high-precision[={OFF|ON}]** |
| **System Variable** | [**windowing\_use\_high\_precision**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_windowing_use_high_precision) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | Yes |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Whether to compute window operations without loss of precision. See [Section 8.2.1.21, “Window Function Optimization”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#window-function-optimization).

### 5.1.9使用系统变量

[5.1.9.1 System Variable Privileges](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)

[5.1.9.2 Dynamic System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dynamic-system-variables)

[5.1.9.3 Persisted System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables)

[5.1.9.4 Nonpersistible and Persist-Restricted System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#nonpersistible-system-variables)

[5.1.9.5 Structured System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#structured-system-variables)

The MySQL server maintains many system variables that configure its operation. [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables), describes the meaning of these variables. Each system variable has a default value. System variables can be set at server startup using options on the command line or in an option file. Most of them can be changed dynamically while the server is running by means of the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, which enables you to modify operation of the server without having to stop and restart it. You can also use system variable values in expressions.

Many system variables are built in. System variables may also be installed by server plugins or components:

* System variables implemented by a server plugin are exposed when the plugin is installed and have names that begin with the plugin name. For example, the **audit\_log** plugin implements a system variable named [**audit\_log\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_policy).
* System variables implemented by a component are exposed when the component is installed and have names that begin with a component-specific prefix. For example, the **log\_filter\_dragnet** error log filter component implements a system variable named **log\_error\_filter\_rules**, the full name of which is [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules). To refer to this variable, use the full name.

There are two scopes in which system variables exist. Global variables affect the overall operation of the server. Session variables affect its operation for individual client connections. A given system variable can have both a global and a session value. Global and session system variables are related as follows:

* When the server starts, it initializes each global variable to its default value. These defaults can be changed by options specified on the command line or in an option file. (See [Section 4.2.2, “Specifying Program Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#program-options).)
* The server also maintains a set of session variables for each client that connects. The client's session variables are initialized at connect time using the current values of the corresponding global variables. For example, a client's SQL mode is controlled by the session [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) value, which is initialized when the client connects to the value of the global [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) value.

For some system variables, the session value is not initialized from the corresponding global value; if so, that is indicated in the variable description.

System variable values can be set globally at server startup by using options on the command line or in an option file. At startup, the syntax for system variables is the same as for command options, so within variable names, dashes and underscores may be used interchangeably. For example, [--general\_log=ON](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) and [--general-log=ON](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) are equivalent.

When you use a startup option to set a variable that takes a numeric value, the value can be given with a suffix of **K**, **M**, or **G** (either uppercase or lowercase) to indicate a multiplier of 1024, 10242 or 10243; that is, units of kilobytes, megabytes, or gigabytes, respectively. As of MySQL 8.0.14, a suffix can also be **T**, **P**, and **E** to indicate a multiplier of 10244, 10245 or 10246. Thus, the following command starts the server with an **InnoDB** log file size of 16 megabytes and a maximum packet size of one gigabyte:

mysqld --innodb-log-file-size=16M --max-allowed-packet=1G

Within an option file, those variables are set like this:

[mysqld]

innodb\_log\_file\_size=16M

max\_allowed\_packet=1G

The lettercase of suffix letters does not matter; **16M** and **16m** are equivalent, as are **1G** and **1g**.

To restrict the maximum value to which a system variable can be set at runtime with the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, specify this maximum by using an option of the form --maximum-***var\_name***=***value*** at server startup. For example, to prevent the value of [**innodb\_log\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_file_size) from being increased to more than 32MB at runtime, use the option --maximum-innodb-log-file-size=32M.

Many system variables are dynamic and can be changed at runtime by using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement. For a list, see [Section 5.1.9.2, “Dynamic System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dynamic-system-variables). To change a system variable with [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), refer to it by name, optionally preceded by a modifier. At runtime, system variable names must be written using underscores, not dashes. The following examples briefly illustrate this syntax:

* Set a global system variable:
* SET GLOBAL max\_connections = 1000;
* SET @@GLOBAL.max\_connections = 1000;
* Persist a global system variable to the mysqld-auto.cnf file (and set the runtime value):
* SET PERSIST max\_connections = 1000;
* SET @@PERSIST.max\_connections = 1000;
* Persist a global system variable to the mysqld-auto.cnf file (without setting the runtime value):
* SET PERSIST\_ONLY back\_log = 1000;
* SET @@PERSIST\_ONLY.back\_log = 1000;
* Set a session system variable:
* SET SESSION sql\_mode = 'TRADITIONAL';
* SET @@SESSION.sql\_mode = 'TRADITIONAL';
* SET @@sql\_mode = 'TRADITIONAL';

For complete details about [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax, see [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable). For a description of the privilege requirements for setting and persisting system variables, see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)

Suffixes for specifying a value multiplier can be used when setting a variable at server startup, but not to set the value with [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) at runtime. On the other hand, with [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) you can assign a variable's value using an expression, which is not true when you set a variable at server startup. For example, the first of the following lines is legal at server startup, but the second is not:

shell> **mysql --max\_allowed\_packet=16M**

shell> **mysql --max\_allowed\_packet=16\*1024\*1024**

Conversely, the second of the following lines is legal at runtime, but the first is not:

mysql> **SET GLOBAL max\_allowed\_packet=16M;**

mysql> **SET GLOBAL max\_allowed\_packet=16\*1024\*1024;**

To display system variable names and values, use the [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables) statement:

mysql> **SHOW VARIABLES;**

+---------------------------------+-----------------------------------+

| Variable\_name | Value |

+---------------------------------+-----------------------------------+

| auto\_increment\_increment | 1 |

| auto\_increment\_offset | 1 |

| automatic\_sp\_privileges | ON |

| back\_log | 151 |

| basedir | /home/mysql/ |

| binlog\_cache\_size | 32768 |

| bulk\_insert\_buffer\_size | 8388608 |

| character\_set\_client | utf8 |

| character\_set\_connection | utf8 |

| character\_set\_database | utf8mb4 |

| character\_set\_filesystem | binary |

| character\_set\_results | utf8 |

| character\_set\_server | utf8mb4 |

| character\_set\_system | utf8 |

| character\_sets\_dir | /home/mysql/share/mysql/charsets/ |

| collation\_connection | utf8\_general\_ci |

| collation\_database | utf8mb4\_0900\_ai\_ci |

| collation\_server | utf8mb4\_0900\_ai\_ci |

...

| innodb\_autoextend\_increment | 8 |

| innodb\_buffer\_pool\_size | 8388608 |

| innodb\_commit\_concurrency | 0 |

| innodb\_concurrency\_tickets | 500 |

| innodb\_data\_file\_path | ibdata1:10M:autoextend |

| innodb\_data\_home\_dir | |

...

| version | 8.0.1-dmr-log |

| version\_comment | Source distribution |

| version\_compile\_machine | i686 |

| version\_compile\_os | suse-linux |

| wait\_timeout | 28800 |

+---------------------------------+-----------------------------------+

With a [**LIKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_like) clause, the statement displays only those variables that match the pattern. To obtain a specific variable name, use a [**LIKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_like) clause as shown:

SHOW VARIABLES LIKE 'max\_join\_size';

SHOW SESSION VARIABLES LIKE 'max\_join\_size';

To get a list of variables whose name match a pattern, use the **%** wildcard character in a [**LIKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_like) clause:

SHOW VARIABLES LIKE '%size%';

SHOW GLOBAL VARIABLES LIKE '%size%';

Wildcard characters can be used in any position within the pattern to be matched. Strictly speaking, because **\_** is a wildcard that matches any single character, you should escape it as **\\_** to match it literally. In practice, this is rarely necessary.

For [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables), if you specify neither **GLOBAL** nor **SESSION**, MySQL returns **SESSION** values.

The reason for requiring the **GLOBAL** keyword when setting **GLOBAL**-only variables but not when retrieving them is to prevent problems in the future:

* Were a **SESSION** variable to be removed that has the same name as a **GLOBAL** variable, a client with privileges sufficient to modify global variables might accidentally change the **GLOBAL** variable rather than just the **SESSION** variable for its own session.
* Were a **SESSION** variable to be added with the same name as a **GLOBAL** variable, a client that intends to change the **GLOBAL** variable might find only its own **SESSION** variable changed.

#### 5.1.9.1 System Variable Privileges

A system variable can have a global value that affects server operation as a whole, a session value that affects only the current session, or both:

* For dynamic system variables, the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement can be used to change their global or session runtime value (or both), to affect operation of the current server instance. (For information about dynamic variables, see [Section 5.1.9.2, “Dynamic System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dynamic-system-variables).)
* For certain global system variables, [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) can be used to persist their value to the mysqld-auto.cnf file in the data directory, to affect server operation for subsequent startups. (For information about persisting system variables and the mysqld-auto.cnf file, see [Section 5.1.9.3, “Persisted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables).)
* For persisted global system variables, [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) can be used to remove their value from mysqld-auto.cnf, to affect server operation for subsequent startups.

This section describes the privileges required for operations that assign values to system variables at runtime. This includes operations that affect runtime values, and operations that persist values.

To set a global system variable, use a [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement with the appropriate keyword. These privileges apply:

* To set a global system variable runtime value, use the [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, which requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege).
* To persist a global system variable to the mysqld-auto.cnf file (and set the runtime value), use the [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, which requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege.
* To persist a global system variable to the mysqld-auto.cnf file (without setting the runtime value), use the [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, which requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) and [**PERSIST\_RO\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_persist-ro-variables-admin) privileges. [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) can be used for both dynamic and read-only system variables, but is particularly useful for persisting read-only variables, for which [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) cannot be used.
* Some global system variables are persist-restricted (see [Section 5.1.9.4, “Nonpersistible and Persist-Restricted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#nonpersistible-system-variables)). To persist these variables, use the [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, which requires the privileges described previously. In addition, you must connect to the server using an encrypted connection and supply an SSL certificate with the Subject value specified by the [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) system variable.

To remove a persisted global system variable from the mysqld-auto.cnf file, use the [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) statement. These privileges apply:

* For dynamic system variables, [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege.
* For read-only system variables, [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) and [**PERSIST\_RO\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_persist-ro-variables-admin) privileges.
* For persist-restricted variables, [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) does not require an encrypted connection to the server made using a particular SSL certificate.

If a global system variable has any exceptions to the preceding privilege requirements, the variable description indicates those exceptions. Examples include [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) and [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles), which require additional privileges. These additional privileges apply to operations that set the global runtime value, but not operations that persist the value.

To set a session system variable runtime value, use the [**SET SESSION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement. In contrast to setting global runtime values, setting session runtime values normally requires no special privileges and can be done by any user to affect the current session. For some system variables, setting the session value may have effects outside the current session and thus is a restricted operation that can be done only by users who have a special privilege:

* As of MySQL 8.0.14, the privilege required is [**SESSION\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_session-variables-admin).

**Note**

Any user who has [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) effectively has [**SESSION\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_session-variables-admin) by implication and need not be granted [**SESSION\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_session-variables-admin) explicitly.

* Prior to MySQL 8.0.14, the privilege required is [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super).

If a session system variable is restricted, the variable description indicates that restriction. Examples include [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) and [**sql\_log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_log_bin). Setting the session value of these variables affects binary logging for the current session, but may also have wider implications for the integrity of server replication and backups.

[**SESSION\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_session-variables-admin) enables administrators to minimize the privilege footprint of users who may previously have been granted [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) or [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) for the purpose of enabling them to modify restricted session system variables. Suppose that an administrator has created the following role to confer the ability to set restricted session system variables:

CREATE ROLE set\_session\_sysvars;

GRANT SYSTEM\_VARIABLES\_ADMIN ON \*.\* TO set\_session\_sysvars;

Any user granted the **set\_session\_sysvars** role (and who has that role active) is able to set restricted session system variables. However, that user is also able to set global system variables, which may be undesirable.

By modifying the role to have [**SESSION\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_session-variables-admin) instead of [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin), the role privileges can be reduced to the ability to set restricted session system variables and nothing else. To modify the role, use these statements:

GRANT SESSION\_VARIABLES\_ADMIN ON \*.\* TO set\_session\_sysvars;

REVOKE SYSTEM\_VARIABLES\_ADMIN ON \*.\* FROM set\_session\_sysvars;

Modifying the role has an immediate effect: Any account granted the **set\_session\_sysvars** role no longer has [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) and is not able to set global system variables without being granted that ability explicitly. A similar [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant)/[**REVOKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#revoke) sequence can be applied to any account that was granted [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) directly rather than by means of a role.

#### 5.1.9.2 Dynamic System Variables

Many server system variables are dynamic and can be set at runtime. See [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable). For a description of the privilege requirements for setting system variables, see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)

The following table lists all dynamic system variables applicable within **mysqld**.

The table lists each variable's data type and scope. The last column indicates whether the scope for each variable is Global, Session, or both. Please see the corresponding item descriptions for details on setting and using the variables. Where appropriate, direct links to further information about the items are provided.

Variables that have a type of “string” take a string value. Variables that have a type of “numeric” take a numeric value. Variables that have a type of “boolean” can be set to 0, 1, **ON** or **OFF**. Variables that are marked as “enumeration” normally should be set to one of the available values for the variable, but can also be set to the number that corresponds to the desired enumeration value. For enumerated system variables, the first enumeration value corresponds to 0. This differs from the [**ENUM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#enum) data type used for table columns, for which the first enumeration value corresponds to 1.

**Table 5.4 Dynamic System Variable Summary**

| **Variable Name** | **Variable Type** | **Variable Scope** |
| --- | --- | --- |
| [**activate\_all\_roles\_on\_login**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_activate_all_roles_on_login) | Boolean | Global |
| [**admin\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_ca) | File name | Global |
| [**admin\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_capath) | Directory name | Global |
| [**admin\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cert) | File name | Global |
| [**admin\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_cipher) | String | Global |
| [**admin\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crl) | File name | Global |
| [**admin\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_crlpath) | Directory name | Global |
| [**admin\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_ssl_key) | File name | Global |
| [**admin\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_ciphersuites) | String | Global |
| [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) | String | Global |
| [**audit\_log\_connection\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_connection_policy) | Enumeration | Global |
| [**audit\_log\_exclude\_accounts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_exclude_accounts) | String | Global |
| [**audit\_log\_flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_flush) | Boolean | Global |
| [**audit\_log\_include\_accounts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_include_accounts) | String | Global |
| [**audit\_log\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_max_size) | Integer | Global |
| [**audit\_log\_password\_history\_keep\_days**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_password_history_keep_days) | Integer | Global |
| [**audit\_log\_prune\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_prune_seconds) | Integer | Global |
| [**audit\_log\_read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_read_buffer_size) | Integer | Varies |
| [**audit\_log\_rotate\_on\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_rotate_on_size) | Integer | Global |
| [**audit\_log\_statement\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_audit_log_statement_policy) | Enumeration | Global |
| [**authentication\_ldap\_sasl\_auth\_method\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_auth_method_name) | String | Global |
| [**authentication\_ldap\_sasl\_bind\_base\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_base_dn) | String | Global |
| [**authentication\_ldap\_sasl\_bind\_root\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_root_dn) | String | Global |
| [**authentication\_ldap\_sasl\_bind\_root\_pwd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_bind_root_pwd) | String | Global |
| [**authentication\_ldap\_sasl\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_ca_path) | String | Global |
| [**authentication\_ldap\_sasl\_group\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_group_search_attr) | String | Global |
| [**authentication\_ldap\_sasl\_group\_search\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_group_search_filter) | String | Global |
| [**authentication\_ldap\_sasl\_init\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_init_pool_size) | Integer | Global |
| [**authentication\_ldap\_sasl\_log\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_log_status) | Integer | Global |
| [**authentication\_ldap\_sasl\_max\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_max_pool_size) | Integer | Global |
| [**authentication\_ldap\_sasl\_referral**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_referral) | Boolean | Global |
| [**authentication\_ldap\_sasl\_server\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_server_host) | String | Global |
| [**authentication\_ldap\_sasl\_server\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_server_port) | Integer | Global |
| [**authentication\_ldap\_sasl\_tls**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_tls) | Boolean | Global |
| [**authentication\_ldap\_sasl\_user\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_sasl_user_search_attr) | String | Global |
| [**authentication\_ldap\_simple\_auth\_method\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_auth_method_name) | String | Global |
| [**authentication\_ldap\_simple\_bind\_base\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_base_dn) | String | Global |
| [**authentication\_ldap\_simple\_bind\_root\_dn**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_root_dn) | String | Global |
| [**authentication\_ldap\_simple\_bind\_root\_pwd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_bind_root_pwd) | String | Global |
| [**authentication\_ldap\_simple\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_ca_path) | String | Global |
| [**authentication\_ldap\_simple\_group\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_group_search_attr) | String | Global |
| [**authentication\_ldap\_simple\_group\_search\_filter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_group_search_filter) | String | Global |
| [**authentication\_ldap\_simple\_init\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_init_pool_size) | Integer | Global |
| [**authentication\_ldap\_simple\_log\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_log_status) | Integer | Global |
| [**authentication\_ldap\_simple\_max\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_max_pool_size) | Integer | Global |
| [**authentication\_ldap\_simple\_referral**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_referral) | Boolean | Global |
| [**authentication\_ldap\_simple\_server\_host**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_server_host) | String | Global |
| [**authentication\_ldap\_simple\_server\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_server_port) | Integer | Global |
| [**authentication\_ldap\_simple\_tls**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_tls) | Boolean | Global |
| [**authentication\_ldap\_simple\_user\_search\_attr**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_authentication_ldap_simple_user_search_attr) | String | Global |
| [**auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_increment) | Integer | Both |
| [**auto\_increment\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_offset) | Integer | Both |
| [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) | Boolean | Both |
| [**automatic\_sp\_privileges**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_automatic_sp_privileges) | Boolean | Global |
| [**avoid\_temporal\_upgrade**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_avoid_temporal_upgrade) | Boolean | Global |
| [**big\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_big_tables) | Boolean | Both |
| [**binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_cache_size) | Integer | Global |
| [**binlog\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_checksum) | String | Global |
| [**binlog\_direct\_non\_transactional\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_direct_non_transactional_updates) | Boolean | Both |
| [**binlog\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_encryption) | Boolean | Global |
| [**binlog\_error\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_error_action) | Enumeration | Global |
| [**binlog\_expire\_logs\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_expire_logs_seconds) | Integer | Global |
| [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) | Enumeration | Both |
| [**binlog\_group\_commit\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_group_commit_sync_delay) | Integer | Global |
| [**binlog\_group\_commit\_sync\_no\_delay\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_group_commit_sync_no_delay_count) | Integer | Global |
| [**binlog\_max\_flush\_queue\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_max_flush_queue_time) | Integer | Global |
| [**binlog\_order\_commits**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_order_commits) | Boolean | Global |
| [**binlog\_row\_image**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_image) | Enumeration | Both |
| [**binlog\_row\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_metadata) | Enumeration | Global |
| [**binlog\_row\_value\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_value_options) | Set | Both |
| [**binlog\_rows\_query\_log\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_rows_query_log_events) | Boolean | Both |
| [**binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_stmt_cache_size) | Integer | Global |
| [**binlog\_transaction\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression) | Boolean | Both |
| [**binlog\_transaction\_compression\_level\_zstd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression_level_zstd) | Integer | Both |
| [**binlog\_transaction\_dependency\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_dependency_history_size) | Integer | Global |
| [**binlog\_transaction\_dependency\_tracking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_dependency_tracking) | Enumeration | Global |
| [**block\_encryption\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_block_encryption_mode) | String | Both |
| [**bulk\_insert\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bulk_insert_buffer_size) | Integer | Both |
| [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) | String | Both |
| [**character\_set\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_connection) | String | Both |
| [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database) | String | Both |
| [**character\_set\_filesystem**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_filesystem) | String | Both |
| [**character\_set\_results**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_results) | String | Both |
| [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server) | String | Both |
| [**check\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_check_proxy_users) | Boolean | Global |
| [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) | Boolean | Global |
| [**clone\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_buffer_size) | Integer | Global |
| [**clone\_ddl\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ddl_timeout) | Integer | Global |
| [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) | Integer | Global |
| [**clone\_enable\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_enable_compression) | Boolean | Global |
| [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) | Integer | Global |
| [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) | Integer | Global |
| [**clone\_max\_network\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_network_bandwidth) | Integer | Global |
| [**clone\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_ca) | File name | Global |
| [**clone\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_cert) | File name | Global |
| [**clone\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_key) | File name | Global |
| [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) | String | Global |
| [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection) | String | Both |
| [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database) | String | Both |
| [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server) | String | Both |
| [**completion\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_completion_type) | Enumeration | Both |
| [**concurrent\_insert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_concurrent_insert) | Enumeration | Global |
| [**connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_connect_timeout) | Integer | Global |
| [**connection\_control\_failed\_connections\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_failed_connections_threshold) | Integer | Global |
| [**connection\_control\_max\_connection\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_max_connection_delay) | Integer | Global |
| [**connection\_control\_min\_connection\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_connection_control_min_connection_delay) | Integer | Global |
| [**cte\_max\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_cte_max_recursion_depth) | Integer | Both |
| [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug) | String | Both |
| [**debug\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug_sync) | String | Session |
| [**default\_collation\_for\_utf8mb4**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_collation_for_utf8mb4) | Enumeration | Both |
| [**default\_password\_lifetime**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_password_lifetime) | Integer | Global |
| [**default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine) | Enumeration | Both |
| [**default\_table\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_table_encryption) | Boolean | Both |
| [**default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine) | Enumeration | Both |
| [**default\_week\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_week_format) | Integer | Both |
| [**delay\_key\_write**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delay_key_write) | Enumeration | Global |
| [**delayed\_insert\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_limit) | Integer | Global |
| [**delayed\_insert\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_insert_timeout) | Integer | Global |
| [**delayed\_queue\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_delayed_queue_size) | Integer | Global |
| [**div\_precision\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_div_precision_increment) | Integer | Both |
| [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) | String | Global |
| [**end\_markers\_in\_json**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_end_markers_in_json) | Boolean | Both |
| [**enforce\_gtid\_consistency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_enforce_gtid_consistency) | Enumeration | Global |
| [**eq\_range\_index\_dive\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_eq_range_index_dive_limit) | Integer | Both |
| [**event\_scheduler**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_event_scheduler) | Enumeration | Global |
| [**expire\_logs\_days**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_expire_logs_days) | Integer | Global |
| [**explicit\_defaults\_for\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_explicit_defaults_for_timestamp) | Boolean | Both |
| [**flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush) | Boolean | Global |
| [**flush\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_flush_time) | Integer | Global |
| [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks) | Boolean | Both |
| [**ft\_boolean\_syntax**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ft_boolean_syntax) | String | Global |
| [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) | Boolean | Global |
| [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) | File name | Global |
| [**generated\_random\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_generated_random_password_length) | Integer | Both |
| [**group\_concat\_max\_len**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_group_concat_max_len) | Integer | Both |
| [**group\_replication\_advertise\_recovery\_endpoints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_advertise_recovery_endpoints) | String | Global |
| [**group\_replication\_allow\_local\_lower\_version\_join**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_allow_local_lower_version_join) | Boolean | Global |
| [**group\_replication\_auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_auto_increment_increment) | Integer | Global |
| [**group\_replication\_autorejoin\_tries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_autorejoin_tries) | Integer | Global |
| [**group\_replication\_bootstrap\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_bootstrap_group) | Boolean | Global |
| [**group\_replication\_clone\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_clone_threshold) | Integer | Global |
| [**group\_replication\_communication\_debug\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_communication_debug_options) | String | Global |
| [**group\_replication\_communication\_max\_message\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_communication_max_message_size) | Integer | Global |
| [**group\_replication\_components\_stop\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_components_stop_timeout) | Integer | Global |
| [**group\_replication\_compression\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_compression_threshold) | Integer | Global |
| [**group\_replication\_consistency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_consistency) | Enumeration | Both |
| [**group\_replication\_enforce\_update\_everywhere\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_enforce_update_everywhere_checks) | Boolean | Global |
| [**group\_replication\_exit\_state\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_exit_state_action) | Enumeration | Global |
| [**group\_replication\_flow\_control\_applier\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_applier_threshold) | Integer | Global |
| [**group\_replication\_flow\_control\_certifier\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_certifier_threshold) | Integer | Global |
| [**group\_replication\_flow\_control\_hold\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_hold_percent) | Integer | Global |
| [**group\_replication\_flow\_control\_max\_commit\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_max_commit_quota) | Integer | Global |
| [**group\_replication\_flow\_control\_member\_quota\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_member_quota_percent) | Integer | Global |
| [**group\_replication\_flow\_control\_min\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_min_quota) | Integer | Global |
| [**group\_replication\_flow\_control\_min\_recovery\_quota**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_min_recovery_quota) | Integer | Global |
| [**group\_replication\_flow\_control\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_mode) | Enumeration | Global |
| [**group\_replication\_flow\_control\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_period) | Integer | Global |
| [**group\_replication\_flow\_control\_release\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_flow_control_release_percent) | Integer | Global |
| [**group\_replication\_force\_members**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_force_members) | String | Global |
| [**group\_replication\_group\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_group_name) | String | Global |
| [**group\_replication\_group\_seeds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_group_seeds) | String | Global |
| [**group\_replication\_gtid\_assignment\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_gtid_assignment_block_size) | Integer | Global |
| [**group\_replication\_ip\_allowlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ip_allowlist) | String | Global |
| [**group\_replication\_ip\_whitelist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ip_whitelist) | String | Global |
| [**group\_replication\_local\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_local_address) | String | Global |
| [**group\_replication\_member\_expel\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_member_expel_timeout) | Integer | Global |
| [**group\_replication\_member\_weight**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_member_weight) | Integer | Global |
| [**group\_replication\_message\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_message_cache_size) | Integer | Global |
| [**group\_replication\_poll\_spin\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_poll_spin_loops) | Integer | Global |
| [**group\_replication\_recovery\_complete\_at**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_complete_at) | Enumeration | Global |
| [**group\_replication\_recovery\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_compression_algorithms) | Set | Global |
| [**group\_replication\_recovery\_get\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_get_public_key) | Boolean | Global |
| [**group\_replication\_recovery\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_public_key_path) | File name | Global |
| [**group\_replication\_recovery\_reconnect\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_reconnect_interval) | Integer | Global |
| [**group\_replication\_recovery\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_retry_count) | Integer | Global |
| [**group\_replication\_recovery\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_ca) | String | Global |
| [**group\_replication\_recovery\_ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_capath) | String | Global |
| [**group\_replication\_recovery\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_cert) | String | Global |
| [**group\_replication\_recovery\_ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_cipher) | String | Global |
| [**group\_replication\_recovery\_ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_crl) | File name | Global |
| [**group\_replication\_recovery\_ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_crlpath) | Directory name | Global |
| [**group\_replication\_recovery\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_key) | String | Global |
| [**group\_replication\_recovery\_ssl\_verify\_server\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_ssl_verify_server_cert) | Boolean | Global |
| [**group\_replication\_recovery\_tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_tls_ciphersuites) | String | Global |
| [**group\_replication\_recovery\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_tls_version) | String | Global |
| [**group\_replication\_recovery\_use\_ssl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_use_ssl) | Boolean | Global |
| [**group\_replication\_recovery\_zstd\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_zstd_compression_level) | Integer | Global |
| [**group\_replication\_single\_primary\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_single_primary_mode) | Boolean | Global |
| [**group\_replication\_ssl\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_ssl_mode) | Enumeration | Global |
| [**group\_replication\_start\_on\_boot**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_start_on_boot) | Boolean | Global |
| [**group\_replication\_tls\_source**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_tls_source) | Enumeration | Global |
| [**group\_replication\_transaction\_size\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_transaction_size_limit) | Integer | Global |
| [**group\_replication\_unreachable\_majority\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_unreachable_majority_timeout) | Integer | Global |
| [**group\_replication\_view\_change\_uuid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_view_change_uuid) | String | Global |
| [**gtid\_executed\_compression\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed_compression_period) | Integer | Global |
| [**gtid\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_mode) | Enumeration | Global |
| [**gtid\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_next) | Enumeration | Session |
| [**gtid\_purged**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_purged) | String | Global |
| [**histogram\_generation\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_histogram_generation_max_mem_size) | Integer | Both |
| [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) | Integer | Global |
| [**identity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_identity) | Integer | Session |
| [**immediate\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_immediate_server_version) | Integer | Session |
| [**information\_schema\_stats\_expiry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_information_schema_stats_expiry) | Integer | Both |
| [**init\_connect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_init_connect) | String | Global |
| [**init\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_init_slave) | String | Global |
| [**innodb\_adaptive\_flushing**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_flushing) | Boolean | Global |
| [**innodb\_adaptive\_flushing\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_flushing_lwm) | Integer | Global |
| [**innodb\_adaptive\_hash\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_hash_index) | Boolean | Global |
| [**innodb\_adaptive\_max\_sleep\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_adaptive_max_sleep_delay) | Integer | Global |
| [**innodb\_api\_bk\_commit\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_bk_commit_interval) | Integer | Global |
| [**innodb\_api\_trx\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_api_trx_level) | Integer | Global |
| [**innodb\_autoextend\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_autoextend_increment) | Integer | Global |
| [**innodb\_background\_drop\_list\_empty**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_background_drop_list_empty) | Boolean | Global |
| [**innodb\_buffer\_pool\_dump\_at\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_at_shutdown) | Boolean | Global |
| [**innodb\_buffer\_pool\_dump\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_now) | Boolean | Global |
| [**innodb\_buffer\_pool\_dump\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_dump_pct) | Integer | Global |
| [**innodb\_buffer\_pool\_filename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_filename) | File name | Global |
| [**innodb\_buffer\_pool\_in\_core\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_in_core_file) | Boolean | Global |
| [**innodb\_buffer\_pool\_load\_abort**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_abort) | Boolean | Global |
| [**innodb\_buffer\_pool\_load\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_now) | Boolean | Global |
| [**innodb\_buffer\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_size) | Integer | Global |
| [**innodb\_change\_buffer\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffer_max_size) | Integer | Global |
| [**innodb\_change\_buffering**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffering) | Enumeration | Global |
| [**innodb\_change\_buffering\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_change_buffering_debug) | Integer | Global |
| [**innodb\_checkpoint\_disabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_checkpoint_disabled) | Boolean | Global |
| [**innodb\_checksum\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_checksum_algorithm) | Enumeration | Global |
| [**innodb\_cmp\_per\_index\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_cmp_per_index_enabled) | Boolean | Global |
| [**innodb\_commit\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_commit_concurrency) | Integer | Global |
| [**innodb\_compress\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compress_debug) | Enumeration | Global |
| [**innodb\_compression\_failure\_threshold\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_failure_threshold_pct) | Integer | Global |
| [**innodb\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_level) | Integer | Global |
| [**innodb\_compression\_pad\_pct\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_compression_pad_pct_max) | Integer | Global |
| [**innodb\_concurrency\_tickets**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_concurrency_tickets) | Integer | Global |
| [**innodb\_ddl\_log\_crash\_reset\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ddl_log_crash_reset_debug) | Boolean | Global |
| [**innodb\_deadlock\_detect**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_deadlock_detect) | Boolean | Global |
| [**innodb\_default\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_default_row_format) | Enumeration | Global |
| [**innodb\_disable\_sort\_file\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_disable_sort_file_cache) | Boolean | Global |
| [**innodb\_extend\_and\_initialize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_extend_and_initialize) | Boolean | Global |
| [**innodb\_fast\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fast_shutdown) | Integer | Global |
| [**innodb\_fil\_make\_page\_dirty\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fil_make_page_dirty_debug) | Integer | Global |
| [**innodb\_file\_per\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_file_per_table) | Boolean | Global |
| [**innodb\_fill\_factor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fill_factor) | Integer | Global |
| [**innodb\_flush\_log\_at\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_log_at_timeout) | Integer | Global |
| [**innodb\_flush\_log\_at\_trx\_commit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_log_at_trx_commit) | Enumeration | Global |
| [**innodb\_flush\_neighbors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_neighbors) | Enumeration | Global |
| [**innodb\_flush\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_sync) | Boolean | Global |
| [**innodb\_flushing\_avg\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flushing_avg_loops) | Integer | Global |
| [**innodb\_fsync\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fsync_threshold) | Integer | Global |
| [**innodb\_ft\_aux\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_aux_table) | String | Global |
| [**innodb\_ft\_enable\_diag\_print**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_enable_diag_print) | Boolean | Global |
| [**innodb\_ft\_enable\_stopword**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_enable_stopword) | Boolean | Both |
| [**innodb\_ft\_num\_word\_optimize**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_num_word_optimize) | Integer | Global |
| [**innodb\_ft\_result\_cache\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_result_cache_limit) | Integer | Global |
| [**innodb\_ft\_server\_stopword\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_server_stopword_table) | String | Global |
| [**innodb\_ft\_user\_stopword\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_ft_user_stopword_table) | String | Both |
| [**innodb\_idle\_flush\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_idle_flush_pct) | Integer | Global |
| [**innodb\_io\_capacity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_io_capacity) | Integer | Global |
| [**innodb\_io\_capacity\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_io_capacity_max) | Integer | Global |
| [**innodb\_limit\_optimistic\_insert\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_limit_optimistic_insert_debug) | Integer | Global |
| [**innodb\_lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_lock_wait_timeout) | Integer | Both |
| [**innodb\_log\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_buffer_size) | Integer | Global |
| [**innodb\_log\_checkpoint\_fuzzy\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checkpoint_fuzzy_now) | Boolean | Global |
| [**innodb\_log\_checkpoint\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checkpoint_now) | Boolean | Global |
| [**innodb\_log\_checksums**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_checksums) | Boolean | Global |
| [**innodb\_log\_compressed\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_compressed_pages) | Boolean | Global |
| [**innodb\_log\_spin\_cpu\_abs\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_spin_cpu_abs_lwm) | Integer | Global |
| [**innodb\_log\_spin\_cpu\_pct\_hwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_spin_cpu_pct_hwm) | Integer | Global |
| [**innodb\_log\_wait\_for\_flush\_spin\_hwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_wait_for_flush_spin_hwm) | Integer | Global |
| [**innodb\_log\_write\_ahead\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_write_ahead_size) | Integer | Global |
| [**innodb\_log\_writer\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_writer_threads) | Boolean | Global |
| [**innodb\_lru\_scan\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_lru_scan_depth) | Integer | Global |
| [**innodb\_max\_dirty\_pages\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_dirty_pages_pct) | Numeric | Global |
| [**innodb\_max\_dirty\_pages\_pct\_lwm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_dirty_pages_pct_lwm) | Numeric | Global |
| [**innodb\_max\_purge\_lag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_purge_lag) | Integer | Global |
| [**innodb\_max\_purge\_lag\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_purge_lag_delay) | Integer | Global |
| [**innodb\_max\_undo\_log\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_max_undo_log_size) | Integer | Global |
| [**innodb\_merge\_threshold\_set\_all\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_merge_threshold_set_all_debug) | Integer | Global |
| [**innodb\_monitor\_disable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_disable) | String | Global |
| [**innodb\_monitor\_enable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_enable) | String | Global |
| [**innodb\_monitor\_reset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_reset) | Enumeration | Global |
| [**innodb\_monitor\_reset\_all**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_monitor_reset_all) | Enumeration | Global |
| [**innodb\_old\_blocks\_pct**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_old_blocks_pct) | Integer | Global |
| [**innodb\_old\_blocks\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_old_blocks_time) | Integer | Global |
| [**innodb\_online\_alter\_log\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_online_alter_log_max_size) | Integer | Global |
| [**innodb\_optimize\_fulltext\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_optimize_fulltext_only) | Boolean | Global |
| [**innodb\_parallel\_read\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_parallel_read_threads) | Integer | Session |
| [**innodb\_print\_all\_deadlocks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_print_all_deadlocks) | Boolean | Global |
| [**innodb\_print\_ddl\_logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_print_ddl_logs) | Boolean | Global |
| [**innodb\_purge\_batch\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_batch_size) | Integer | Global |
| [**innodb\_purge\_rseg\_truncate\_frequency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_purge_rseg_truncate_frequency) | Integer | Global |
| [**innodb\_random\_read\_ahead**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_random_read_ahead) | Boolean | Global |
| [**innodb\_read\_ahead\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_read_ahead_threshold) | Integer | Global |
| [**innodb\_redo\_log\_archive\_dirs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_archive_dirs) | String | Global |
| [**innodb\_redo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_encrypt) | Boolean | Global |
| [**innodb\_replication\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_replication_delay) | Integer | Global |
| [**innodb\_rollback\_segments**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_rollback_segments) | Integer | Global |
| [**innodb\_saved\_page\_number\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_saved_page_number_debug) | Integer | Global |
| [**innodb\_segment\_reserve\_factor**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_segment_reserve_factor) | Numeric | Global |
| [**innodb\_spin\_wait\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_spin_wait_delay) | Integer | Global |
| [**innodb\_spin\_wait\_pause\_multiplier**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_spin_wait_pause_multiplier) | Integer | Global |
| [**innodb\_stats\_auto\_recalc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_auto_recalc) | Boolean | Global |
| [**innodb\_stats\_include\_delete\_marked**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_include_delete_marked) | Boolean | Global |
| [**innodb\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_method) | Enumeration | Global |
| [**innodb\_stats\_on\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_on_metadata) | Boolean | Global |
| [**innodb\_stats\_persistent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_persistent) | Boolean | Global |
| [**innodb\_stats\_persistent\_sample\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_persistent_sample_pages) | Integer | Global |
| [**innodb\_stats\_transient\_sample\_pages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_stats_transient_sample_pages) | Integer | Global |
| [**innodb\_status\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_status_output) | Boolean | Global |
| [**innodb\_status\_output\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_status_output_locks) | Boolean | Global |
| [**innodb\_strict\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_strict_mode) | Boolean | Both |
| [**innodb\_sync\_spin\_loops**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_sync_spin_loops) | Integer | Global |
| [**innodb\_table\_locks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_table_locks) | Boolean | Both |
| [**innodb\_thread\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_thread_concurrency) | Integer | Global |
| [**innodb\_thread\_sleep\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_thread_sleep_delay) | Integer | Global |
| [**innodb\_tmpdir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_tmpdir) | Directory name | Both |
| [**innodb\_trx\_purge\_view\_update\_only\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_trx_purge_view_update_only_debug) | Boolean | Global |
| [**innodb\_trx\_rseg\_n\_slots\_debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_trx_rseg_n_slots_debug) | Integer | Global |
| [**innodb\_undo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_encrypt) | Boolean | Global |
| [**innodb\_undo\_log\_truncate**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_truncate) | Boolean | Global |
| [**innodb\_undo\_tablespaces**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_tablespaces) | Integer | Global |
| [**innodb\_use\_fdatasync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_use_fdatasync) | Boolean | Global |
| [**insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_insert_id) | Integer | Session |
| [**interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_interactive_timeout) | Integer | Both |
| [**internal\_tmp\_disk\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_disk_storage_engine) | Enumeration | Global |
| [**internal\_tmp\_mem\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_internal_tmp_mem_storage_engine) | Enumeration | Both |
| [**join\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_join_buffer_size) | Integer | Both |
| [**keep\_files\_on\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_keep_files_on_create) | Boolean | Both |
| [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) | Integer | Global |
| [**key\_cache\_age\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_age_threshold) | Integer | Global |
| [**key\_cache\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_block_size) | Integer | Global |
| [**key\_cache\_division\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_division_limit) | Integer | Global |
| [**keyring\_aws\_cmk\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_cmk_id) | String | Global |
| [**keyring\_aws\_region**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_aws_region) | Enumeration | Global |
| [**keyring\_encrypted\_file\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_encrypted_file_data) | File name | Global |
| [**keyring\_encrypted\_file\_password**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_encrypted_file_password) | String | Global |
| [**keyring\_file\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_file_data) | File name | Global |
| [**keyring\_hashicorp\_auth\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_auth_path) | String | Global |
| [**keyring\_hashicorp\_ca\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_ca_path) | File name | Global |
| [**keyring\_hashicorp\_caching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_caching) | Boolean | Global |
| [**keyring\_hashicorp\_role\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_role_id) | String | Global |
| [**keyring\_hashicorp\_secret\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_secret_id) | String | Global |
| [**keyring\_hashicorp\_server\_url**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_server_url) | String | Global |
| [**keyring\_hashicorp\_store\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_hashicorp_store_path) | String | Global |
| [**keyring\_okv\_conf\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_okv_conf_dir) | Directory name | Global |
| [**keyring\_operations**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_keyring_operations) | Boolean | Global |
| [**last\_insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_last_insert_id) | Integer | Session |
| [**lc\_messages**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_messages) | String | Both |
| [**lc\_time\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_time_names) | String | Both |
| [**local\_infile**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_local_infile) | Boolean | Global |
| [**lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_wait_timeout) | Integer | Both |
| [**log\_bin\_trust\_function\_creators**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_trust_function_creators) | Boolean | Global |
| [**log\_bin\_use\_v1\_row\_events**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_use_v1_row_events) | Boolean | Global |
| [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) | String | Global |
| [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) | String | Global |
| [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) | Integer | Global |
| [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) | Set | Global |
| [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) | Boolean | Global |
| [**log\_raw**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_raw) | Boolean | Global |
| [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) | Boolean | Global |
| [**log\_slow\_extra**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_extra) | Boolean | Global |
| [**log\_slow\_slave\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slow_slave_statements) | Boolean | Global |
| [**log\_statements\_unsafe\_for\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_statements_unsafe_for_binlog) | Boolean | Global |
| [**log\_syslog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog) | Boolean | Global |
| [**log\_syslog\_facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_facility) | String | Global |
| [**log\_syslog\_include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_include_pid) | Boolean | Global |
| [**log\_syslog\_tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_tag) | String | Global |
| [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) | Integer | Global |
| [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) | Enumeration | Global |
| [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) | Numeric | Both |
| [**low\_priority\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_low_priority_updates) | Boolean | Both |
| [**mandatory\_roles**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mandatory_roles) | String | Global |
| [**master\_info\_repository**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_info_repository) | String | Global |
| [**master\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_verify_checksum) | Boolean | Global |
| [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) | Integer | Both |
| [**max\_binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_cache_size) | Integer | Global |
| [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size) | Integer | Global |
| [**max\_binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_stmt_cache_size) | Integer | Global |
| [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) | Integer | Global |
| [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) | Integer | Global |
| [**max\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_delayed_threads) | Integer | Both |
| [**max\_error\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_error_count) | Integer | Both |
| [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) | Integer | Both |
| [**max\_heap\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_heap_table_size) | Integer | Both |
| [**max\_insert\_delayed\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_insert_delayed_threads) | Integer | Both |
| [**max\_join\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_join_size) | Integer | Both |
| [**max\_length\_for\_sort\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_length_for_sort_data) | Integer | Both |
| [**max\_points\_in\_geometry**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_points_in_geometry) | Integer | Both |
| [**max\_prepared\_stmt\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_prepared_stmt_count) | Integer | Global |
| [**max\_relay\_log\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_relay_log_size) | Integer | Global |
| [**max\_seeks\_for\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_seeks_for_key) | Integer | Both |
| [**max\_sort\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sort_length) | Integer | Both |
| [**max\_sp\_recursion\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_sp_recursion_depth) | Integer | Both |
| [**max\_user\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_user_connections) | Integer | Both |
| [**max\_write\_lock\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_write_lock_count) | Integer | Global |
| [**min\_examined\_row\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_min_examined_row_limit) | Integer | Both |
| [**myisam\_data\_pointer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_data_pointer_size) | Integer | Global |
| [**myisam\_max\_sort\_file\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_max_sort_file_size) | Integer | Global |
| [**myisam\_repair\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_repair_threads) | Integer | Both |
| [**myisam\_sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_sort_buffer_size) | Integer | Both |
| [**myisam\_stats\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_stats_method) | Enumeration | Both |
| [**myisam\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_use_mmap) | Boolean | Global |
| [**mysql\_firewall\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_mysql_firewall_mode) | Boolean | Global |
| [**mysql\_firewall\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_mysql_firewall_trace) | Boolean | Global |
| [**mysql\_native\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_mysql_native_password_proxy_users) | Boolean | Global |
| [**mysqlx\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_compression_algorithms) | Set | Global |
| [**mysqlx\_connect\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_connect_timeout) | Integer | Global |
| [**mysqlx\_deflate\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_deflate_default_compression_level) | Integer | Global |
| [**mysqlx\_deflate\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_deflate_max_client_compression_level) | Integer | Global |
| [**mysqlx\_document\_id\_unique\_prefix**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_document_id_unique_prefix) | Integer | Global |
| [**mysqlx\_enable\_hello\_notice**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_enable_hello_notice) | Boolean | Global |
| [**mysqlx\_idle\_worker\_thread\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_idle_worker_thread_timeout) | Integer | Global |
| [**mysqlx\_interactive\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_interactive_timeout) | Integer | Global |
| [**mysqlx\_lz4\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_lz4_default_compression_level) | Integer | Global |
| [**mysqlx\_lz4\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_lz4_max_client_compression_level) | Integer | Global |
| [**mysqlx\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_max_allowed_packet) | Integer | Global |
| [**mysqlx\_max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_max_connections) | Integer | Global |
| [**mysqlx\_min\_worker\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_min_worker_threads) | Integer | Global |
| [**mysqlx\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_read_timeout) | Integer | Session |
| [**mysqlx\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_wait_timeout) | Integer | Session |
| [**mysqlx\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_write_timeout) | Integer | Session |
| [**mysqlx\_zstd\_default\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_zstd_default_compression_level) | Integer | Global |
| [**mysqlx\_zstd\_max\_client\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_zstd_max_client_compression_level) | Integer | Global |
| **ndb\_allow\_copying\_alter\_table** | Boolean | Both |
| [**ndb\_autoincrement\_prefetch\_sz**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_autoincrement_prefetch_sz) | Integer | Both |
| **ndb\_blob\_read\_batch\_bytes** | Integer | Both |
| **ndb\_blob\_write\_batch\_bytes** | Integer | Both |
| [**ndb\_cache\_check\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_cache_check_time) | Integer | Global |
| [**ndb\_clear\_apply\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_clear_apply_status) | Boolean | Global |
| [**ndb\_conflict\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_conflict_role) | Enumeration | Global |
| [**ndb\_data\_node\_neighbour**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_data_node_neighbour) | Integer | Global |
| [**ndb\_dbg\_check\_shares**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_dbg_check_shares) | Integer | Both |
| [**ndb\_default\_column\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_default_column_format) | Enumeration | Global |
| [**ndb\_default\_column\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_default_column_format) | Enumeration | Global |
| [**ndb\_deferred\_constraints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_deferred_constraints) | Integer | Both |
| [**ndb\_deferred\_constraints**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_deferred_constraints) | Integer | Both |
| [**ndb\_distribution**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_distribution) | Enumeration | Global |
| [**ndb\_distribution**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_distribution) | Enumeration | Global |
| [**ndb\_eventbuffer\_free\_percent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_eventbuffer_free_percent) | Integer | Global |
| [**ndb\_eventbuffer\_max\_alloc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_eventbuffer_max_alloc) | Integer | Global |
| [**ndb\_extra\_logging**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_extra_logging) | Integer | Global |
| [**ndb\_force\_send**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_force_send) | Boolean | Both |
| [**ndb\_fully\_replicated**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_fully_replicated) | Boolean | Both |
| [**ndb\_index\_stat\_enable**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_index_stat_enable) | Boolean | Both |
| [**ndb\_index\_stat\_option**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_index_stat_option) | String | Both |
| [**ndb\_join\_pushdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_join_pushdown) | Boolean | Both |
| [**ndb\_log\_binlog\_index**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_binlog_index) | Boolean | Global |
| [**ndb\_log\_empty\_epochs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_epochs) | Boolean | Global |
| [**ndb\_log\_empty\_epochs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_epochs) | Boolean | Global |
| [**ndb\_log\_empty\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_update) | Boolean | Global |
| [**ndb\_log\_empty\_update**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_empty_update) | Boolean | Global |
| [**ndb\_log\_exclusive\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_exclusive_reads) | Boolean | Both |
| [**ndb\_log\_exclusive\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_log_exclusive_reads) | Boolean | Both |
| **ndb\_log\_update\_as\_write** | Boolean | Global |
| **ndb\_log\_update\_minimal** | Boolean | Global |
| **ndb\_log\_updated\_only** | Boolean | Global |
| [**ndb\_metadata\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_check) | Boolean | Global |
| [**ndb\_metadata\_check\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_check_interval) | Integer | Global |
| [**ndb\_metadata\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_metadata_sync) | Boolean | Global |
| **ndb\_optimization\_delay** | Integer | Global |
| [**ndb\_read\_backup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_read_backup) | Boolean | Global |
| [**ndb\_recv\_thread\_activation\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_recv_thread_activation_threshold) | Integer | Global |
| [**ndb\_recv\_thread\_cpu\_mask**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_recv_thread_cpu_mask) | Bitmap | Global |
| [**ndb\_report\_thresh\_binlog\_epoch\_slip**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_report_thresh_binlog_epoch_slip) | Integer | Global |
| [**ndb\_report\_thresh\_binlog\_mem\_usage**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_report_thresh_binlog_mem_usage) | Integer | Global |
| [**ndb\_row\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_row_checksum) | Integer | Both |
| [**ndb\_schema\_dist\_lock\_wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_schema_dist_lock_wait_timeout) | Integer | Global |
| [**ndb\_show\_foreign\_key\_mock\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_show_foreign_key_mock_tables) | Boolean | Global |
| [**ndb\_slave\_conflict\_role**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_slave_conflict_role) | Enumeration | Global |
| [**ndb\_table\_no\_logging**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_table_no_logging) | Boolean | Session |
| [**ndb\_table\_temporary**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_table_temporary) | Boolean | Session |
| [**ndb\_use\_exact\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_exact_count) | Boolean | Both |
| [**ndb\_use\_transactions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndb_use_transactions) | Boolean | Both |
| [**ndbinfo\_max\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_max_bytes) | Integer | Both |
| [**ndbinfo\_max\_rows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_max_rows) | Integer | Both |
| [**ndbinfo\_offline**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_offline) | Boolean | Global |
| [**ndbinfo\_show\_hidden**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_ndbinfo_show_hidden) | Boolean | Both |
| [**net\_buffer\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_buffer_length) | Integer | Both |
| [**net\_read\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_read_timeout) | Integer | Both |
| [**net\_retry\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_retry_count) | Integer | Both |
| [**net\_write\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_net_write_timeout) | Integer | Both |
| [**new**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_new) | Boolean | Both |
| [**offline\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_offline_mode) | Boolean | Global |
| [**old\_alter\_table**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_old_alter_table) | Boolean | Both |
| [**optimizer\_prune\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_prune_level) | Integer | Both |
| [**optimizer\_search\_depth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_search_depth) | Integer | Both |
| [**optimizer\_switch**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_switch) | Set | Both |
| [**optimizer\_trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace) | String | Both |
| [**optimizer\_trace\_features**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_features) | String | Both |
| [**optimizer\_trace\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_limit) | Integer | Both |
| [**optimizer\_trace\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_max_mem_size) | Integer | Both |
| [**optimizer\_trace\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_optimizer_trace_offset) | Integer | Both |
| [**original\_commit\_timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_commit_timestamp) | Numeric | Session |
| [**original\_server\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_original_server_version) | Integer | Session |
| [**parser\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_parser_max_mem_size) | Integer | Both |
| [**partial\_revokes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_partial_revokes) | Boolean | Global |
| [**password\_history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_history) | Integer | Global |
| [**password\_require\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_require_current) | Boolean | Global |
| [**password\_reuse\_interval**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_password_reuse_interval) | Integer | Global |
| [**performance\_schema\_max\_digest\_sample\_age**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_max_digest_sample_age) | Integer | Global |
| [**performance\_schema\_show\_processlist**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#sysvar_performance_schema_show_processlist) | Boolean | Global |
| [**preload\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_preload_buffer_size) | Integer | Both |
| [**print\_identified\_with\_as\_hex**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_print_identified_with_as_hex) | Boolean | Both |
| [**profiling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling) | Boolean | Both |
| [**profiling\_history\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_profiling_history_size) | Integer | Both |
| [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) | Set | Global |
| [**pseudo\_slave\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_slave_mode) | Boolean | Session |
| [**pseudo\_thread\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_thread_id) | Integer | Session |
| [**query\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_alloc_block_size) | Integer | Both |
| [**query\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_query_prealloc_size) | Integer | Both |
| [**rand\_seed1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed1) | Integer | Session |
| [**rand\_seed2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rand_seed2) | Integer | Session |
| [**range\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_alloc_block_size) | Integer | Both |
| [**range\_optimizer\_max\_mem\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_range_optimizer_max_mem_size) | Integer | Both |
| [**rbr\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rbr_exec_mode) | Enumeration | Both |
| [**read\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_buffer_size) | Integer | Both |
| [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) | Boolean | Global |
| [**read\_rnd\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_rnd_buffer_size) | Integer | Both |
| [**regexp\_stack\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_stack_limit) | Integer | Global |
| [**regexp\_time\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_regexp_time_limit) | Integer | Global |
| [**relay\_log\_info\_repository**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_info_repository) | String | Global |
| [**relay\_log\_purge**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_purge) | Boolean | Global |
| [**replication\_optimize\_for\_static\_plugin\_config**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_replication_optimize_for_static_plugin_config) | Boolean | Global |
| [**replication\_sender\_observe\_commit\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_replication_sender_observe_commit_only) | Boolean | Global |
| [**require\_row\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_row_format) | Boolean | Session |
| [**require\_secure\_transport**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_require_secure_transport) | Boolean | Global |
| [**resultset\_metadata**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_resultset_metadata) | Enumeration | Session |
| [**rewriter\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_enabled) | Boolean | Global |
| [**rewriter\_verbose**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_verbose) | Integer | Global |
| [**rpl\_read\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_read_size) | Integer | Global |
| [**rpl\_semi\_sync\_master\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_enabled) | Boolean | Global |
| [**rpl\_semi\_sync\_master\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_timeout) | Integer | Global |
| [**rpl\_semi\_sync\_master\_trace\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_trace_level) | Integer | Global |
| [**rpl\_semi\_sync\_master\_wait\_for\_slave\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_for_slave_count) | Integer | Global |
| [**rpl\_semi\_sync\_master\_wait\_no\_slave**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_no_slave) | Boolean | Global |
| [**rpl\_semi\_sync\_master\_wait\_point**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_master_wait_point) | Enumeration | Global |
| [**rpl\_semi\_sync\_slave\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_slave_enabled) | Boolean | Global |
| [**rpl\_semi\_sync\_slave\_trace\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_semi_sync_slave_trace_level) | Integer | Global |
| [**rpl\_stop\_slave\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_rpl_stop_slave_timeout) | Integer | Global |
| [**schema\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_schema_definition_cache) | Integer | Global |
| [**secondary\_engine\_cost\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_secondary_engine_cost_threshold) | Numeric | Session |
| [**select\_into\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_buffer_size) | Integer | Both |
| [**select\_into\_disk\_sync**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync) | Boolean | Both |
| [**select\_into\_disk\_sync\_delay**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_select_into_disk_sync_delay) | Integer | Both |
| [**server\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_id) | Integer | Global |
| [**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) | Enumeration | Both |
| [**session\_track\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_schema) | Boolean | Both |
| [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) | Boolean | Both |
| [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) | String | Both |
| [**session\_track\_transaction\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_transaction_info) | Enumeration | Both |
| [**sha256\_password\_proxy\_users**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_proxy_users) | Boolean | Global |
| [**show\_create\_table\_skip\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_skip_secondary_engine) | Boolean | Session |
| [**show\_create\_table\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_create_table_verbosity) | Boolean | Both |
| [**show\_old\_temporals**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_show_old_temporals) | Boolean | Both |
| [**slave\_allow\_batching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_slave_allow_batching) | Boolean | Global |
| [**slave\_checkpoint\_group**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_checkpoint_group) | Integer | Global |
| [**slave\_checkpoint\_period**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_checkpoint_period) | Integer | Global |
| [**slave\_compressed\_protocol**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_compressed_protocol) | Boolean | Global |
| [**slave\_exec\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_exec_mode) | Enumeration | Global |
| [**slave\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_max_allowed_packet) | Integer | Global |
| [**slave\_net\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_net_timeout) | Integer | Global |
| [**slave\_parallel\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_type) | Enumeration | Global |
| [**slave\_parallel\_workers**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_workers) | Integer | Global |
| [**slave\_pending\_jobs\_size\_max**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_pending_jobs_size_max) | Integer | Global |
| [**slave\_preserve\_commit\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_preserve_commit_order) | Boolean | Global |
| [**slave\_rows\_search\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_rows_search_algorithms) | Set | Global |
| [**slave\_sql\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_sql_verify_checksum) | Boolean | Global |
| [**slave\_transaction\_retries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_transaction_retries) | Integer | Global |
| [**slave\_type\_conversions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_type_conversions) | Set | Global |
| [**slow\_launch\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_launch_time) | Integer | Global |
| [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) | Boolean | Global |
| [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) | File name | Global |
| [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) | Integer | Both |
| [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null) | Boolean | Both |
| [**sql\_big\_selects**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_big_selects) | Boolean | Both |
| [**sql\_buffer\_result**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_buffer_result) | Boolean | Both |
| [**sql\_log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_log_bin) | Boolean | Session |
| [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) | Boolean | Both |
| [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) | Set | Both |
| [**sql\_notes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_notes) | Boolean | Both |
| [**sql\_quote\_show\_create**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_quote_show_create) | Boolean | Both |
| [**sql\_require\_primary\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_require_primary_key) | Boolean | Both |
| [**sql\_safe\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_safe_updates) | Boolean | Both |
| [**sql\_select\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_select_limit) | Integer | Both |
| [**sql\_slave\_skip\_counter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_slave_skip_counter) | Integer | Global |
| [**sql\_warnings**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_warnings) | Boolean | Both |
| [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca) | File name | Global |
| [**ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_capath) | Directory name | Global |
| [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) | File name | Global |
| [**ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cipher) | String | Global |
| [**ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crl) | File name | Global |
| [**ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crlpath) | Directory name | Global |
| [**ssl\_fips\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_fips_mode) | Enumeration | Global |
| [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key) | File name | Global |
| [**stored\_program\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_cache) | Integer | Global |
| [**stored\_program\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_stored_program_definition_cache) | Integer | Global |
| [**super\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_super_read_only) | Boolean | Global |
| [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) | Integer | Global |
| [**sync\_master\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_master_info) | Integer | Global |
| [**sync\_relay\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_relay_log) | Integer | Global |
| [**sync\_relay\_log\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_relay_log_info) | Integer | Global |
| [**syseventlog.facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.facility) | String | Global |
| [**syseventlog.include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.include_pid) | Boolean | Global |
| [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag) | String | Global |
| [**table\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_definition_cache) | Integer | Global |
| [**table\_encryption\_privilege\_check**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_encryption_privilege_check) | Boolean | Global |
| [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) | Integer | Global |
| [**tablespace\_definition\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tablespace_definition_cache) | Integer | Global |
| [**temptable\_max\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_mmap) | Integer | Global |
| [**temptable\_max\_ram**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_max_ram) | Integer | Global |
| [**temptable\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_use_mmap) | Boolean | Global |
| [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) | Integer | Global |
| [**thread\_pool\_high\_priority\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_high_priority_connection) | Integer | Both |
| [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads) | Integer | Global |
| [**thread\_pool\_max\_unused\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_unused_threads) | Integer | Global |
| [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer) | Integer | Global |
| [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) | Integer | Global |
| [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) | String | Both |
| [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp) | Numeric | Session |
| [**tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_ciphersuites) | String | Global |
| [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version) | String | Global |
| [**tmp\_table\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tmp_table_size) | Integer | Both |
| [**transaction\_alloc\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_alloc_block_size) | Integer | Both |
| [**transaction\_allow\_batching**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#sysvar_transaction_allow_batching) | Boolean | Session |
| [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) | Enumeration | Both |
| [**transaction\_prealloc\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_prealloc_size) | Integer | Both |
| [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) | Boolean | Both |
| [**transaction\_write\_set\_extraction**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_transaction_write_set_extraction) | Enumeration | Both |
| [**unique\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_unique_checks) | Boolean | Both |
| [**updatable\_views\_with\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_updatable_views_with_limit) | Boolean | Both |
| [**use\_secondary\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_use_secondary_engine) | Enumeration | Session |
| [**validate\_password\_check\_user\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_check_user_name) | Boolean | Global |
| [**validate\_password\_dictionary\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_dictionary_file) | File name | Global |
| [**validate\_password\_length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_length) | Integer | Global |
| [**validate\_password\_mixed\_case\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_mixed_case_count) | Integer | Global |
| [**validate\_password\_number\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_number_count) | Integer | Global |
| [**validate\_password\_policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_policy) | Enumeration | Global |
| [**validate\_password\_special\_char\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password_special_char_count) | Integer | Global |
| [**validate\_password.check\_user\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.check_user_name) | Boolean | Global |
| [**validate\_password.dictionary\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.dictionary_file) | File name | Global |
| [**validate\_password.length**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.length) | Integer | Global |
| [**validate\_password.mixed\_case\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.mixed_case_count) | Integer | Global |
| [**validate\_password.number\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.number_count) | Integer | Global |
| [**validate\_password.policy**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.policy) | Enumeration | Global |
| [**validate\_password.special\_char\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sysvar_validate_password.special_char_count) | Integer | Global |
| [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) | String | Both |
| [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) | Integer | Both |
| [**windowing\_use\_high\_precision**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_windowing_use_high_precision) | Boolean | Both |

#### 5.1.9.3 Persisted System Variables

The MySQL server maintains system variables that configure its operation. A system variable can have a global value that affects server operation as a whole, a session value that affects the current session, or both. Many system variables are dynamic and can be changed at runtime using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement to affect operation of the current server instance. [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) can also be used to persist certain global system variables to the mysqld-auto.cnf file in the data directory, to affect server operation for subsequent startups. [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) removes persisted settings from mysqld-auto.cnf.

The following discussion describes aspects of persisting system variables:

* [Overview of Persisted System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables-overview)
* [Syntax for Persisting System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables-syntax)
* [Obtaining Information About Persisted System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables-information)
* [Format and Server Handling of the mysqld-auto.cnf File](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables-file-handling)

##### Overview of Persisted System Variables

The capability of persisting global system variables at runtime enables server configuration that persists across server startups. Although many system variables can be set at startup from a my.cnf option file, or at runtime using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement, those methods of configuring the server either require login access to the server host, or do not provide the capability of persistently configuring the server at runtime or remotely:

* Modifying an option file requires direct access to that file, which requires login access to the MySQL server host. This is not always convenient.
* Modifying system variables with [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) is a runtime capability that can be done from clients run locally or from remote hosts, but the changes affect only the currently running server instance. The settings are not persistent and do not carry over to subsequent server startups.

To augment administrative capabilities for server configuration beyond what is achievable by editing option files or using [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), MySQL provides variants of [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax that persist system variable settings to a file named mysqld-auto.cnf file in the data directory. Examples:

SET PERSIST max\_connections = 1000;

SET @@PERSIST.max\_connections = 1000;

SET PERSIST\_ONLY back\_log = 100;

SET @@PERSIST\_ONLY.back\_log = 100;

MySQL also provides a [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) statement for removing persisted system variables from mysqld-auto.cnf.

Server configuration performed by persisting system variables has these characteristics:

* Persisted settings are made at runtime.
* Persisted settings are permanent. They apply across server restarts.
* Persisted settings can be made from local clients or clients who connect from a remote host. This provides the convenience of remotely configuring multiple MySQL servers from a central client host.
* To persist system variables, you need not have login access to the MySQL server host or file system access to option files. Ability to persist settings is controlled using the MySQL privilege system. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).
* An administrator with sufficient privileges can reconfigure a server by persisting system variables, then cause the server to use the changed settings immediately by executing a [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) statement.
* Persisted settings provide immediate feedback about errors. An error in a manually entered setting might not be discovered until much later. [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statements that persist system variables avoid the possibility of malformed settings because settings with syntax errors do not succeed and do not change server configuration.

##### Syntax for Persisting System Variables

These [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) syntax options are available for persisting system variables:

* To persist a global system variable to the mysqld-auto.cnf option file in the data directory, precede the variable name by the **PERSIST** keyword or the **@@PERSIST.** qualifier:
* SET PERSIST max\_connections = 1000;
* SET @@PERSIST.max\_connections = 1000;

Like [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) sets the global variable runtime value, but also writes the variable setting to the mysqld-auto.cnf file (replacing any existing variable setting if there is one).

* To persist a global system variable to the mysqld-auto.cnf file without setting the global variable runtime value, precede the variable name by the **PERSIST\_ONLY** keyword or the **@@PERSIST\_ONLY.** qualifier:
* SET PERSIST\_ONLY back\_log = 1000;
* SET @@PERSIST\_ONLY.back\_log = 1000;

Like **PERSIST**, **PERSIST\_ONLY** writes the variable setting to mysqld-auto.cnf. However, unlike **PERSIST**, **PERSIST\_ONLY** does not modify the global variable runtime value. This makes **PERSIST\_ONLY** suitable for configuring read-only system variables that can be set only at server startup.

For more information about [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), see [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable).

These [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) syntax options are available for removing persisted system variables:

* To remove all persisted variables from mysqld-auto.cnf, use [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) without naming any system variable:
* RESET PERSIST;
* To remove a specific persisted variable from mysqld-auto.cnf, name it in the statement:
* RESET PERSIST ***system\_var\_name***;

This includes plugin system variables, even if the plugin is not currently installed. If the variable is not present in the file, an error occurs.

* To remove a specific persisted variable from mysqld-auto.cnf, but produce a warning rather than an error if the variable is not present in the file, add an **IF EXISTS** clause to the previous syntax:
* RESET PERSIST IF EXISTS ***system\_var\_name***;

For more information about [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist), see [Section 13.7.8.7, “RESET PERSIST Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist).

Using [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) to persist a global system variable to a value of **DEFAULT** or to its literal default value assigns the variable its default value and adds a setting for the variable to mysqld-auto.cnf. To remove the variable from the file, use [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist).

Some system variables cannot be persisted. See [Section 5.1.9.4, “Nonpersistible and Persist-Restricted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#nonpersistible-system-variables).

A system variable implemented by a plugin can be persisted if the plugin is installed when the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement is executed. Assignment of the persisted plugin variable takes effect for subsequent server restarts if the plugin is still installed. If the plugin is no longer installed, the plugin variable does not exist when the server reads the mysqld-auto.cnf file. In this case, the server writes a warning to the error log and continues:

currently unknown variable '***var\_name***'

was read from the persisted config file

##### Obtaining Information About Persisted System Variables

The Performance Schema [**persisted\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-persisted-variables-table) table provides an SQL interface to the mysqld-auto.cnf file, enabling its contents to be inspected at runtime using [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements. See [Section 27.12.14.1, “Performance Schema persisted\_variables Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-persisted-variables-table).

The Performance Schema [**variables\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-variables-info-table) table contains information showing when and by which user each system variable was most recently set. See [Section 27.12.14.2, “Performance Schema variables\_info Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-variables-info-table).

[**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) affects the contents of the [**persisted\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-persisted-variables-table) table because the table contents correspond to the contents of the mysqld-auto.cnf file. On the other hand, because [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) does not change variable values, it has no effect on the contents of the [**variables\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-variables-info-table) table until the server is restarted.

##### Format and Server Handling of the mysqld-auto.cnf File

The mysqld-auto.cnf file uses a **JSON** format like this (reformatted slightly for readability):

{

"Version": 1,

"mysql\_server": {

"max\_connections": {

"Value": "152",

"Metadata": {

"Timestamp": 1519921341372531,

"User": "root",

"Host": "localhost"

}

},

"transaction\_isolation": {

"Value": "READ-COMMITTED",

"Metadata": {

"Timestamp": 1519921553880520,

"User": "root",

"Host": "localhost"

}

},

"mysql\_server\_static\_options": {

"innodb\_api\_enable\_mdl": {

"Value": "0",

"Metadata": {

"Timestamp": 1519922873467872,

"User": "root",

"Host": "localhost"

}

},

"log\_slave\_updates": {

"Value": "1",

"Metadata": {

"Timestamp": 1519925628441588,

"User": "root",

"Host": "localhost"

}

}

}

}

}

At startup, the server processes the mysqld-auto.cnf file after all other option files (see [Section 4.2.2.2, “Using Option Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-files)). The server handles the file contents as follows:

* If the [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load) system variable is disabled, the server ignores the mysqld-auto.cnf file.
* The **"mysql\_server\_static\_options"** section contains read-only variables persisted using [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable). The section may also (despite its name) contain certain dynamic variables that are not read only. All variables present inside this section are appended to the command line and processed with other command-line options.
* All remaining persisted variables are set by executing the equivalent of a [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement later, just before the server starts listening for client connections. These settings therefore do not take effect until late in the startup process, which might be unsuitable for certain system variables. It may be preferable to set such variables in my.cnf rather than in mysqld-auto.cnf.

Management of the mysqld-auto.cnf file should be left to the server. Manipulation of the file should be performed only using [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) and [**RESET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) statements, not manually:

* Removal of the file results in a loss of all persisted settings at the next server startup. (This is permissible if your intent is to reconfigure the server without these settings.) To remove all settings in the file without removing the file itself, use this statement:
* RESET PERSIST;
* Manual changes to the file may result in a parse error at server startup. In this case, the server reports an error and exits. If this issue occurs, start the server with the [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load) system variable disabled or with the [--no-defaults](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_no-defaults) option. Alternatively, remove the mysqld-auto.cnf file. However, as noted previously, removing this file results in a loss of all persisted settings.

#### 5.1.9.4 Nonpersistible and Persist-Restricted System Variables

**[SET PERSIST](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\sql-statements.html" \l "set-variable" \o "13.7.6.1 SET Syntax for Variable Assignment)** and [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) enable global system variables to be persisted to the mysqld-auto.cnf option file in the data directory (see [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable)). However, not all system variables can be persisted, or can be persisted only under certain restrictive conditions. Here are some reasons why a system variable might be nonpersistible or persist-restricted:

* Session system variables cannot be persisted. Session variables cannot be set at server startup, so there is no reason to persist them.
* A global system variable might involve sensitive data such that it should be settable only by a user with direct access to the server host.
* A global system variable might be read only (that is, set only by the server). In this case, it cannot be set by users at all, whether at server startup or at runtime.
* A global system variable might be intended only for internal use.

Nonpersistible system variables cannot be persisted under any circumstances. As of MySQL 8.0.14, persist-restricted system variables can be persisted with [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), but only by users for which the following conditions are satisfied:

* The [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) system variable is set to an SSL certificate X.509 Subject value.
* The user connects to the server using an encrypted connection and supplies an SSL certificate with the designated Subject value.
* The user has sufficient privileges to use [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) (see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)).

For example, [**protocol\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_version) is read only and set only by the server, so it cannot be persisted under any circumstances. On the other hand, [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) is persist-restricted, so it can be set by users who satisfy the preceding conditions.

The following system variables are nonpersistible. This list may change with ongoing development.

audit\_log\_current\_session

audit\_log\_filter\_id

caching\_sha2\_password\_digest\_rounds

character\_set\_system

core\_file

have\_statement\_timeout

have\_symlink

hostname

innodb\_version

keyring\_hashicorp\_auth\_path

keyring\_hashicorp\_ca\_path

keyring\_hashicorp\_caching

keyring\_hashicorp\_commit\_auth\_path

keyring\_hashicorp\_commit\_ca\_path

keyring\_hashicorp\_commit\_caching

keyring\_hashicorp\_commit\_role\_id

keyring\_hashicorp\_commit\_server\_url

keyring\_hashicorp\_commit\_store\_path

keyring\_hashicorp\_role\_id

keyring\_hashicorp\_secret\_id

keyring\_hashicorp\_server\_url

keyring\_hashicorp\_store\_path

large\_files\_support

large\_page\_size

license

locked\_in\_memory

log\_bin

log\_bin\_basename

log\_bin\_index

lower\_case\_file\_system

ndb\_version

ndb\_version\_string

persist\_only\_admin\_x509\_subject

persisted\_globals\_load

protocol\_version

relay\_log\_basename

relay\_log\_index

server\_uuid

skip\_external\_locking

system\_time\_zone

version\_comment

version\_compile\_machine

version\_compile\_os

version\_compile\_zlib

Persist-restricted system variables are those that are read only and can be set on the command line or in an option file, other than [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) and [**persisted\_globals\_load**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persisted_globals_load). This list may change with ongoing development.

audit\_log\_file

audit\_log\_format

auto\_generate\_certs

basedir

bind\_address

caching\_sha2\_password\_auto\_generate\_rsa\_keys

caching\_sha2\_password\_private\_key\_path

caching\_sha2\_password\_public\_key\_path

character\_sets\_dir

daemon\_memcached\_engine\_lib\_name

daemon\_memcached\_engine\_lib\_path

daemon\_memcached\_option

datadir

default\_authentication\_plugin

ft\_stopword\_file

init\_file

innodb\_buffer\_pool\_load\_at\_startup

innodb\_data\_file\_path

innodb\_data\_home\_dir

innodb\_dedicated\_server

innodb\_directories

innodb\_force\_load\_corrupted

innodb\_log\_group\_home\_dir

innodb\_page\_size

innodb\_read\_only

innodb\_temp\_data\_file\_path

innodb\_temp\_tablespaces\_dir

innodb\_undo\_directory

innodb\_undo\_tablespaces

keyring\_encrypted\_file\_data

keyring\_encrypted\_file\_password

lc\_messages\_dir

log\_error

mecab\_rc\_file

named\_pipe

pid\_file

plugin\_dir

port

relay\_log

relay\_log\_info\_file

secure\_file\_priv

sha256\_password\_auto\_generate\_rsa\_keys

sha256\_password\_private\_key\_path

sha256\_password\_public\_key\_path

shared\_memory

shared\_memory\_base\_name

skip\_networking

slave\_load\_tmpdir

socket

ssl\_ca

ssl\_capath

ssl\_cert

ssl\_crl

ssl\_crlpath

ssl\_key

tmpdir

version\_tokens\_session\_number

To configure the server to enable persisting persist-restricted system variables, use this procedure:

1. Ensure that MySQL is configured to support encrypted connections. See [Section 6.3.1, “Configuring MySQL to Use Encrypted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections).
2. Designate an SSL certificate X.509 Subject value that signifies the ability to persist persist-restricted system variables, and generate a certificate that has that Subject. See [Section 6.3.3, “Creating SSL and RSA Certificates and Keys”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#creating-ssl-rsa-files).
3. Start the server with [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) set to the designated Subject value. For example, put these lines in your server my.cnf file:
4. [mysqld]
5. persist\_only\_admin\_x509\_subject="***subject-value***"

The format of the Subject value is the same as used for [**CREATE USER ... REQUIRE SUBJECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user). See [Section 13.7.1.3, “CREATE USER Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user).

You must perform this step directly on the MySQL server host because [**persist\_only\_admin\_x509\_subject**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_persist_only_admin_x509_subject) itself cannot be persisted at runtime.

1. Restart the server.
2. Distribute the SSL certificate that has the designated Subject value to users who are to be permitted to persist persist-restricted system variables.

Suppose that myclient-cert.pem is the SSL certificate to be used by clients who can persist persist-restricted system variables. Display the certificate contents using the **openssl** command:

shell> **openssl x509 -text -in myclient-cert.pem**

Certificate:

Data:

Version: 3 (0x2)

Serial Number: 2 (0x2)

Signature Algorithm: md5WithRSAEncryption

Issuer: C=US, ST=IL, L=Chicago, O=MyOrg, OU=CA, CN=MyCN

Validity

Not Before: Oct 18 17:03:03 2018 GMT

Not After : Oct 15 17:03:03 2028 GMT

Subject: C=US, ST=IL, L=Chicago, O=MyOrg, OU=client, CN=MyCN

...

The **openssl** output shows that the certificate Subject value is:

C=US, ST=IL, L=Chicago, O=MyOrg, OU=client, CN=MyCN

To specify the Subject for MySQL, use this format:

/C=US/ST=IL/L=Chicago/O=MyOrg/OU=client/CN=MyCN

Configure the server my.cnf file with the Subject value:

[mysqld]

persist\_only\_admin\_x509\_subject="/C=US/ST=IL/L=Chicago/O=MyOrg/OU=client/CN=MyCN"

Restart the server so that the new configuration takes effect.

Distribute the SSL certificate (and any other associated SSL files) to the appropriate users. Such a user then connects to the server with the certificate and any other SSL options required to establish an encrypted connection.

To use X.509, clients must specify the [--ssl-key](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-key) and [--ssl-cert](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-cert) options to connect. It is recommended but not required that [--ssl-ca](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_ssl-ca) also be specified so that the public certificate provided by the server can be verified. For example:

shell> **mysql --ssl-key=myclient-key.pem --ssl-cert=myclient-cert.pem --ssl-ca=mycacert.pem**

Assuming that the user has sufficient privileges to use [**SET PERSIST\_ONLY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), persist-restricted system variables can be persisted like this:

mysql> **SET PERSIST\_ONLY socket = '/tmp/mysql.sock';**

Query OK, 0 rows affected (0.00 sec)

If the server is not configured to enable persisting persist-restricted system variables, or the user does not satisfy the required conditions for that capability, an error occurs:

mysql> **SET PERSIST\_ONLY socket = '/tmp/mysql.sock';**

ERROR 1238 (HY000): Variable 'socket' is a non persistent read only variable

#### 5.1.9.5 Structured System Variables

A structured variable differs from a regular system variable in two respects:

* Its value is a structure with components that specify server parameters considered to be closely related.
* There might be several instances of a given type of structured variable. Each one has a different name and refers to a different resource maintained by the server.

MySQL supports one structured variable type, which specifies parameters governing the operation of key caches. A key cache structured variable has these components:

* [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size)
* [**key\_cache\_block\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_block_size)
* [**key\_cache\_division\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_division_limit)
* [**key\_cache\_age\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_cache_age_threshold)

This section describes the syntax for referring to structured variables. Key cache variables are used for syntax examples, but specific details about how key caches operate are found elsewhere, in [Section 8.10.2, “The MyISAM Key Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#myisam-key-cache).

To refer to a component of a structured variable instance, you can use a compound name in ***instance\_name.component\_name*** format. Examples:

hot\_cache.key\_buffer\_size

hot\_cache.key\_cache\_block\_size

cold\_cache.key\_cache\_block\_size

For each structured system variable, an instance with the name of **default** is always predefined. If you refer to a component of a structured variable without any instance name, the **default** instance is used. Thus, **default.key\_buffer\_size** and [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) both refer to the same system variable.

Structured variable instances and components follow these naming rules:

* For a given type of structured variable, each instance must have a name that is unique within variables of that type. However, instance names need not be unique across structured variable types. For example, each structured variable has an instance named **default**, so **default** is not unique across variable types.
* The names of the components of each structured variable type must be unique across all system variable names. If this were not true (that is, if two different types of structured variables could share component member names), it would not be clear which default structured variable to use for references to member names that are not qualified by an instance name.
* If a structured variable instance name is not legal as an unquoted identifier, refer to it as a quoted identifier using backticks. For example, **hot-cache** is not legal, but **`hot-cache`** is.
* **global**, **session**, and **local** are not legal instance names. This avoids a conflict with notation such as **@@GLOBAL.*var\_name*** for referring to nonstructured system variables.

Currently, the first two rules have no possibility of being violated because the only structured variable type is the one for key caches. These rules may assume greater significance if some other type of structured variable is created in the future.

With one exception, you can refer to structured variable components using compound names in any context where simple variable names can occur. For example, you can assign a value to a structured variable using a command-line option:

shell> **mysqld --hot\_cache.key\_buffer\_size=64K**

In an option file, use this syntax:

[mysqld]

hot\_cache.key\_buffer\_size=64K

If you start the server with this option, it creates a key cache named **hot\_cache** with a size of 64KB in addition to the default key cache that has a default size of 8MB.

Suppose that you start the server as follows:

shell> **mysqld --key\_buffer\_size=256K \**

**--extra\_cache.key\_buffer\_size=128K \**

**--extra\_cache.key\_cache\_block\_size=2048**

In this case, the server sets the size of the default key cache to 256KB. (You could also have written --default.key\_buffer\_size=256K.) In addition, the server creates a second key cache named **extra\_cache** that has a size of 128KB, with the size of block buffers for caching table index blocks set to 2048 bytes.

The following example starts the server with three different key caches having sizes in a 3:1:1 ratio:

shell> **mysqld --key\_buffer\_size=6M \**

**--hot\_cache.key\_buffer\_size=2M \**

**--cold\_cache.key\_buffer\_size=2M**

Structured variable values may be set and retrieved at runtime as well. For example, to set a key cache named **hot\_cache** to a size of 10MB, use either of these statements:

mysql> **SET GLOBAL hot\_cache.key\_buffer\_size = 10\*1024\*1024;**

mysql> **SET @@GLOBAL.hot\_cache.key\_buffer\_size = 10\*1024\*1024;**

To retrieve the cache size, do this:

mysql> **SELECT @@GLOBAL.hot\_cache.key\_buffer\_size;**

However, the following statement does not work. The variable is not interpreted as a compound name, but as a simple string for a [**LIKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_like) pattern-matching operation:

mysql> **SHOW GLOBAL VARIABLES LIKE 'hot\_cache.key\_buffer\_size';**

This is the exception to being able to use structured variable names anywhere a simple variable name may occur.

### 5.1.10 服务端系统状态变量

The MySQL server maintains many status variables that provide information about its operation. You can view these variables and their values by using the **SHOW [GLOBAL | SESSION] STATUS** statement (see [Section 13.7.7.37, “SHOW STATUS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-status)). The optional **GLOBAL** keyword aggregates the values over all connections, and **SESSION** shows the values for the current connection.

mysql> **SHOW GLOBAL STATUS;**

+-----------------------------------+------------+

| Variable\_name | Value |

+-----------------------------------+------------+

| Aborted\_clients | 0 |

| Aborted\_connects | 0 |

| Bytes\_received | 155372598 |

| Bytes\_sent | 1176560426 |

...

| Connections | 30023 |

| Created\_tmp\_disk\_tables | 0 |

| Created\_tmp\_files | 3 |

| Created\_tmp\_tables | 2 |

...

| Threads\_created | 217 |

| Threads\_running | 88 |

| Uptime | 1389872 |

+-----------------------------------+------------+

Many status variables are reset to 0 by the [**FLUSH STATUS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-status) statement.

This section provides a description of each status variable. For a status variable summary, see [Section 5.1.6, “Server Status Variable Reference”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-status-variable-reference). For information about status variables specific to NDB Cluster, see [Section 23.3.3.9.3, “NDB Cluster Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#mysql-cluster-status-variables).

The status variables have the following meanings.

* **[Aborted\_clients](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Aborted_clients)**

The number of connections that were aborted because the client died without closing the connection properly. See [Section B.3.2.9, “Communication Errors and Aborted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#communication-errors).

* **[Aborted\_connects](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Aborted_connects)**

The number of failed attempts to connect to the MySQL server. See [Section B.3.2.9, “Communication Errors and Aborted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#communication-errors).

For additional connection-related information, check the [**Connection\_errors\_*xxx***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_xxx) status variables and the [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table.

* **[Authentication\_ldap\_sasl\_supported\_methods](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Authentication_ldap_sasl_supported_methods)**

The **authentication\_ldap\_sasl** plugin that implements SASL LDAP authentication supports multiple authentication methods, but depending on host system configuration, they might not all be available. The [**Authentication\_ldap\_sasl\_supported\_methods**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Authentication_ldap_sasl_supported_methods) variable provides discoverability for the supported methods. Its value is a string consisting of supported method names separated by spaces. Example: **"SCRAM-SHA 1 SCRAM-SHA-256 GSSAPI"**

This variable was added in MySQL 8.0.21.

* **[Binlog\_cache\_disk\_use](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Binlog_cache_disk_use)**

The number of transactions that used the temporary binary log cache but that exceeded the value of [**binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_cache_size) and used a temporary file to store statements from the transaction.

The number of nontransactional statements that caused the binary log transaction cache to be written to disk is tracked separately in the [**Binlog\_stmt\_cache\_disk\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_stmt_cache_disk_use) status variable.

* **[Acl\_cache\_items\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Acl_cache_items_count)**

The number of cached privilege objects. Each object is the privilege combination of a user and its active roles.

* **[Binlog\_cache\_use](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Binlog_cache_use)**

The number of transactions that used the binary log cache.

* **[Binlog\_stmt\_cache\_disk\_use](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Binlog_stmt_cache_disk_use)**

The number of nontransaction statements that used the binary log statement cache but that exceeded the value of [**binlog\_stmt\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_stmt_cache_size) and used a temporary file to store those statements.

* **[Binlog\_stmt\_cache\_use](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Binlog_stmt_cache_use)**

The number of nontransactional statements that used the binary log statement cache.

* **[Bytes\_received](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Bytes_received)**

The number of bytes received from all clients.

* **[Bytes\_sent](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Bytes_sent)**

The number of bytes sent to all clients.

* **[Caching\_sha2\_password\_rsa\_public\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Caching_sha2_password_rsa_public_key)**

The public key used by the **caching\_sha2\_password** authentication plugin for RSA key pair-based password exchange. The value is nonempty only if the server successfully initializes the private and public keys in the files named by the [**caching\_sha2\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_private_key_path) and [**caching\_sha2\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_caching_sha2_password_public_key_path) system variables. The value of [**Caching\_sha2\_password\_rsa\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Caching_sha2_password_rsa_public_key) comes from the latter file.

* **Com\_*xxx***

The **Com\_*xxx*** statement counter variables indicate the number of times each ***xxx*** statement has been executed. There is one status variable for each type of statement. For example, **Com\_delete** and **Com\_update** count [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) and [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) statements, respectively. **Com\_delete\_multi** and **Com\_update\_multi** are similar but apply to [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) and [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) statements that use multiple-table syntax.

All **Com\_stmt\_*xxx*** variables are increased even if a prepared statement argument is unknown or an error occurred during execution. In other words, their values correspond to the number of requests issued, not to the number of requests successfully completed. For example, because status variables are initialized for each server startup and do not persist across restarts, the **Com\_restart** and **Com\_shutdown** variables that track [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) and [**SHUTDOWN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#shutdown) statements normally have a value of zero, but can be nonzero if [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) or [**SHUTDOWN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#shutdown) statements were executed but failed.

The **Com\_stmt\_*xxx*** status variables are as follows:

* + **Com\_stmt\_prepare**
  + **Com\_stmt\_execute**
  + **Com\_stmt\_fetch**
  + **Com\_stmt\_send\_long\_data**
  + **Com\_stmt\_reset**
  + **Com\_stmt\_close**

Those variables stand for prepared statement commands. Their names refer to the **COM\_*xxx*** command set used in the network layer. In other words, their values increase whenever prepared statement API calls such as **mysql\_stmt\_prepare()**, **mysql\_stmt\_execute()**, and so forth are executed. However, **Com\_stmt\_prepare**, **Com\_stmt\_execute** and **Com\_stmt\_close** also increase for [**PREPARE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#prepare), [**EXECUTE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#execute), or [**DEALLOCATE PREPARE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#deallocate-prepare), respectively. Additionally, the values of the older statement counter variables **Com\_prepare\_sql**, **Com\_execute\_sql**, and **Com\_dealloc\_sql** increase for the [**PREPARE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#prepare), [**EXECUTE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#execute), and [**DEALLOCATE PREPARE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#deallocate-prepare) statements. **Com\_stmt\_fetch** stands for the total number of network round-trips issued when fetching from cursors.

**Com\_stmt\_reprepare** indicates the number of times statements were automatically reprepared by the server, for example, after metadata changes to tables or views referred to by the statement. A reprepare operation increments **Com\_stmt\_reprepare**, and also **Com\_stmt\_prepare**.

**Com\_explain\_other** indicates the number of [**EXPLAIN FOR CONNECTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#explain) statements executed. See [Section 8.8.4, “Obtaining Execution Plan Information for a Named Connection”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#explain-for-connection).

**Com\_change\_repl\_filter** indicates the number of [**CHANGE REPLICATION FILTER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-replication-filter) statements executed.

* **[Compression](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Compression)**

Whether the client connection uses compression in the client/server protocol.

As of MySQL 8.0.18, this status variable is deprecated; expect it to be removed in a future version of MySQL. See [Configuring Legacy Connection Compression](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#connection-compression-legacy-configuration).

* **[Compression\_algorithm](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Compression_algorithm)**

The name of the compression algorithm in use for the current connection to the server. The value can be any algorithm permitted in the value of the [**protocol\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_protocol_compression_algorithms) system variable. For example, the value is **uncompressed** if the connection does not use compression, or **zlib** if the connection uses the **zlib** algorithm.

For more information, see [Section 4.2.8, “Connection Compression Control”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#connection-compression-control).

This variable was added in MySQL 8.0.18.

* **[Compression\_level](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Compression_level)**

The compression level in use for the current connection to the server. The value is 6 for **zlib** connections (the default **zlib** algorithm compression level), 1 to 22 for **zstd** connections, and 0 for **uncompressed** connections.

For more information, see [Section 4.2.8, “Connection Compression Control”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#connection-compression-control).

This variable was added in MySQL 8.0.18.

* **[Connection\_errors\_](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_xxx)*[xxx](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_xxx)***

These variables provide information about errors that occur during the client connection process. They are global only and represent error counts aggregated across connections from all hosts. These variables track errors not accounted for by the host cache (see [Section 5.1.12.3, “DNS Lookups and the Host Cache”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache)), such as errors that are not associated with TCP connections, occur very early in the connection process (even before an IP address is known), or are not specific to any particular IP address (such as out-of-memory conditions).

* + **[Connection\_errors\_accept](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_accept)**

The number of errors that occurred during calls to **accept()** on the listening port.

* + **[Connection\_errors\_internal](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_internal)**

The number of connections refused due to internal errors in the server, such as failure to start a new thread or an out-of-memory condition.

* + **[Connection\_errors\_max\_connections](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_max_connections)**

The number of connections refused because the server [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) limit was reached.

* + **[Connection\_errors\_peer\_address](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_peer_address)**

The number of errors that occurred while searching for connecting client IP addresses.

* + **[Connection\_errors\_select](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_select)**

The number of errors that occurred during calls to **select()** or **poll()** on the listening port. (Failure of this operation does not necessarily means a client connection was rejected.)

* + **[Connection\_errors\_tcpwrap](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connection_errors_tcpwrap)**

The number of connections refused by the **libwrap** library.

* **[Connections](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Connections)**

The number of connection attempts (successful or not) to the MySQL server.

* **[Created\_tmp\_disk\_tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Created_tmp_disk_tables)**

The number of internal on-disk temporary tables created by the server while executing statements.

You can compare the number of internal on-disk temporary tables created to the total number of internal temporary tables created by comparing [**Created\_tmp\_disk\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) and [**Created\_tmp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) values.

**Note**

Due to a known limitation, [**Created\_tmp\_disk\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) does not count on-disk temporary tables created in memory-mapped files. By default, the TempTable storage engine overflow mechanism creates internal temporary tables in memory-mapped files. This behavior is controlled by the [**temptable\_use\_mmap**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_temptable_use_mmap) variable, which is enabled by default.

See also [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

* **[Created\_tmp\_files](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Created_tmp_files)**

How many temporary files [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) has created.

* **[Created\_tmp\_tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Created_tmp_tables)**

The number of internal temporary tables created by the server while executing statements.

You can compare the number of internal on-disk temporary tables created to the total number of internal temporary tables created by comparing [**Created\_tmp\_disk\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) and [**Created\_tmp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) values.

See also [Section 8.4.4, “Internal Temporary Table Use in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#internal-temporary-tables).

Each invocation of the [**SHOW STATUS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-status) statement uses an internal temporary table and increments the global [**Created\_tmp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) value.

* **[Current\_tls\_ca](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_ca)**

The active [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca) value in the SSL context that the server uses for new connections. This context value may differ from the current [**ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_ca) system variable value if the system variable has been changed but [**ALTER INSTANCE RELOAD TLS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-instance-reload-tls) has not subsequently been executed to reconfigure the SSL context from the context-related system variable values and update the corresponding status variables. (This potential difference in values applies to each corresponding pair of context-related system and status variables. See [Server-Side Runtime Configuration and Monitoring for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections-server-side-runtime-configuration).)

This variable was added in MySQL 8.0.16.

As of MySQL 8.0.21, the **Current\_tls\_*xxx*** status variable values are also available through the Performance Schema [**tls\_channel\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-tls-channel-status-table) table. See [Section 27.12.21.7, “The tls\_channel\_status Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-tls-channel-status-table).

* **[Current\_tls\_capath](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_capath)**

The active [**ssl\_capath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_capath) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_cert](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_cert)**

The active [**ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cert) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_cipher](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_cipher)**

The active [**ssl\_cipher**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_cipher) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_ciphersuites](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_ciphersuites)**

The active [**tls\_ciphersuites**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_ciphersuites) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_crl](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_crl)**

The active [**ssl\_crl**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crl) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_crlpath](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_crlpath)**

The active [**ssl\_crlpath**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_crlpath) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_key)**

The active [**ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_ssl_key) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Current\_tls\_version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Current_tls_version)**

The active [**tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_tls_version) value in the TSL context that the server uses for new connections. For notes about the relationship between this status variable and its corresponding system variable, see the description of [**Current\_tls\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Current_tls_ca).

This variable was added in MySQL 8.0.16.

* **[Delayed\_errors](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Delayed_errors)**

This status variable is deprecated (because **DELAYED** inserts are not supported); expect it to be removed in a future release.

* **[Delayed\_insert\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Delayed_insert_threads)**

This status variable is deprecated (because **DELAYED** inserts are not supported); expect it to be removed in a future release.

* **[Delayed\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Delayed_writes)**

This status variable is deprecated (because **DELAYED** inserts are not supported); expect it to be removed in a future release.

* **[dragnet.Status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_dragnet.Status)**

The result of the most recent assignment to the [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) system variable, empty if no such assignment has occurred.

This variable was added in MySQL 8.0.12.

* **[Error\_log\_buffered\_bytes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Error_log_buffered_bytes)**

The number of bytes currently used in the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table. It is possible for the value to decrease, for example, if a new event cannot fit until discarding an old event, but the new event is smaller than the old one.

This variable was added in MySQL 8.0.22.

* **[Error\_log\_buffered\_events](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Error_log_buffered_events)**

The number of events currently present in the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table. As with [**Error\_log\_buffered\_bytes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Error_log_buffered_bytes), it is possible for the value to decrease.

This variable was added in MySQL 8.0.22.

* **[Error\_log\_expired\_events](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Error_log_expired_events)**

The number of events discarded from the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table to make room for new events.

This variable was added in MySQL 8.0.22.

* **[Error\_log\_latest\_write](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Error_log_latest_write)**

The time of the last write to the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table.

This variable was added in MySQL 8.0.22.

* **[Flush\_commands](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Flush_commands)**

The number of times the server flushes tables, whether because a user executed a [**FLUSH TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables) statement or due to internal server operation. It is also incremented by receipt of a **COM\_REFRESH** packet. This is in contrast to [**Com\_flush**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx), which indicates how many **FLUSH** statements have been executed, whether [**FLUSH TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables), [**FLUSH LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-logs), and so forth.

* **[group\_replication\_primary\_member](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_group_replication_primary_member)**

Shows the primary member's UUID when the group is operating in single-primary mode. If the group is operating in multi-primary mode, shows an empty string.

The **group\_replication\_primary\_member** status variable is deprecated and is scheduled to be removed in a future version.

* **[Handler\_commit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_commit)**

The number of internal [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statements.

* **[Handler\_delete](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_delete)**

The number of times that rows have been deleted from tables.

* **[Handler\_external\_lock](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_external_lock)**

The server increments this variable for each call to its **external\_lock()** function, which generally occurs at the beginning and end of access to a table instance. There might be differences among storage engines. This variable can be used, for example, to discover for a statement that accesses a partitioned table how many partitions were pruned before locking occurred: Check how much the counter increased for the statement, subtract 2 (2 calls for the table itself), then divide by 2 to get the number of partitions locked.

* **[Handler\_mrr\_init](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_mrr_init)**

The number of times the server uses a storage engine's own Multi-Range Read implementation for table access.

* **[Handler\_prepare](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_prepare)**

A counter for the prepare phase of two-phase commit operations.

* **[Handler\_read\_first](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_first)**

The number of times the first entry in an index was read. If this value is high, it suggests that the server is doing a lot of full index scans (for example, **SELECT col1 FROM foo**, assuming that **col1** is indexed).

* **[Handler\_read\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_key)**

The number of requests to read a row based on a key. If this value is high, it is a good indication that your tables are properly indexed for your queries.

* **[Handler\_read\_last](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_last)**

The number of requests to read the last key in an index. With **ORDER BY**, the server issues a first-key request followed by several next-key requests, whereas with **ORDER BY DESC**, the server issues a last-key request followed by several previous-key requests.

* **[Handler\_read\_next](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_next)**

The number of requests to read the next row in key order. This value is incremented if you are querying an index column with a range constraint or if you are doing an index scan.

* **[Handler\_read\_prev](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_prev)**

The number of requests to read the previous row in key order. This read method is mainly used to optimize **ORDER BY ... DESC**.

* **[Handler\_read\_rnd](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_rnd)**

The number of requests to read a row based on a fixed position. This value is high if you are doing a lot of queries that require sorting of the result. You probably have a lot of queries that require MySQL to scan entire tables or you have joins that do not use keys properly.

* **[Handler\_read\_rnd\_next](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_read_rnd_next)**

The number of requests to read the next row in the data file. This value is high if you are doing a lot of table scans. Generally this suggests that your tables are not properly indexed or that your queries are not written to take advantage of the indexes you have.

* **[Handler\_rollback](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_rollback)**

The number of requests for a storage engine to perform a rollback operation.

* **[Handler\_savepoint](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_savepoint)**

The number of requests for a storage engine to place a savepoint.

* **[Handler\_savepoint\_rollback](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_savepoint_rollback)**

The number of requests for a storage engine to roll back to a savepoint.

* **[Handler\_update](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_update)**

The number of requests to update a row in a table.

* **[Handler\_write](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Handler_write)**

The number of requests to insert a row in a table.

* **[Innodb\_buffer\_pool\_dump\_status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_dump_status)**

The progress of an operation to record the [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) held in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool), triggered by the setting of **innodb\_buffer\_pool\_dump\_at\_shutdown** or **innodb\_buffer\_pool\_dump\_now**.

For related information and examples, see [Section 15.8.3.6, “Saving and Restoring the Buffer Pool State”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-preload-buffer-pool).

* **[Innodb\_buffer\_pool\_load\_status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_load_status)**

The progress of an operation to [warm up](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_warm_up) the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) by reading in a set of [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) corresponding to an earlier point in time, triggered by the setting of [**innodb\_buffer\_pool\_load\_at\_startup**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_at_startup) or [**innodb\_buffer\_pool\_load\_now**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_now). If the operation introduces too much overhead, you can cancel it by setting [**innodb\_buffer\_pool\_load\_abort**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_load_abort).

For related information and examples, see [Section 15.8.3.6, “Saving and Restoring the Buffer Pool State”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-preload-buffer-pool).

* **[Innodb\_buffer\_pool\_bytes\_data](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_bytes_data)**

The total number of bytes in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) containing data. The number includes both [dirty](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dirty_page) and clean pages. For more accurate memory usage calculations than with [**Innodb\_buffer\_pool\_pages\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_data), when [compressed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_compression) tables cause the buffer pool to hold pages of different sizes.

* **[Innodb\_buffer\_pool\_pages\_data](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_data)**

The number of [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) containing data. The number includes both [dirty](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dirty_page) and clean pages. When using [compressed tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_compressed_table), the reported [**Innodb\_buffer\_pool\_pages\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_data) value may be larger than [**Innodb\_buffer\_pool\_pages\_total**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_total) (Bug #59550).

* **[Innodb\_buffer\_pool\_bytes\_dirty](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_bytes_dirty)**

The total current number of bytes held in [dirty pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dirty_page) in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool). For more accurate memory usage calculations than with [**Innodb\_buffer\_pool\_pages\_dirty**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_dirty), when [compressed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_compression) tables cause the buffer pool to hold pages of different sizes.

* **[Innodb\_buffer\_pool\_pages\_dirty](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_dirty)**

The current number of [dirty pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dirty_page) in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool).

* **[Innodb\_buffer\_pool\_pages\_flushed](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_flushed)**

The number of requests to [flush](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_flush) [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) from the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool).

* **[Innodb\_buffer\_pool\_pages\_free](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_free)**

The number of free [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool).

* **[Innodb\_buffer\_pool\_pages\_latched](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_latched)**

The number of latched [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool). These are pages currently being read or written, or that cannot be [flushed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_flush) or removed for some other reason. Calculation of this variable is expensive, so it is available only when the **UNIV\_DEBUG** system is defined at server build time.

* **[Innodb\_buffer\_pool\_pages\_misc](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_misc)**

The number of [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) in the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) that are busy because they have been allocated for administrative overhead, such as [row locks](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_row_lock) or the [adaptive hash index](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_adaptive_hash_index). This value can also be calculated as [**Innodb\_buffer\_pool\_pages\_total**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_total) − [**Innodb\_buffer\_pool\_pages\_free**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_free) − [**Innodb\_buffer\_pool\_pages\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_data). When using [compressed tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_compressed_table), [**Innodb\_buffer\_pool\_pages\_misc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_misc) may report an out-of-bounds value (Bug #59550).

* **[Innodb\_buffer\_pool\_pages\_total](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_pages_total)**

The total size of the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool), in [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page). When using [compressed tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_compressed_table), the reported [**Innodb\_buffer\_pool\_pages\_data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_data) value may be larger than [**Innodb\_buffer\_pool\_pages\_total**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Innodb_buffer_pool_pages_total) (Bug #59550)

* **[Innodb\_buffer\_pool\_read\_ahead](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_read_ahead)**

The number of [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) read into the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) by the [read-ahead](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_read_ahead) background thread.

* **[Innodb\_buffer\_pool\_read\_ahead\_evicted](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_read_ahead_evicted)**

The number of [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) read into the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) by the [read-ahead](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_read_ahead) background thread that were subsequently [evicted](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_eviction) without having been accessed by queries.

* **[Innodb\_buffer\_pool\_read\_ahead\_rnd](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_read_ahead_rnd)**

The number of “random” read-aheads initiated by **InnoDB**. This happens when a query scans a large portion of a table but in random order.

* **[Innodb\_buffer\_pool\_read\_requests](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_read_requests)**

The number of logical read requests.

* **[Innodb\_buffer\_pool\_reads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_reads)**

The number of logical reads that **InnoDB** could not satisfy from the [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool), and had to read directly from disk.

* **[Innodb\_buffer\_pool\_resize\_status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_resize_status)**

The status of an operation to resize the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) dynamically, triggered by setting the [**innodb\_buffer\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_size) parameter dynamically. The [**innodb\_buffer\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_size) parameter is dynamic, which allows you to resize the buffer pool without restarting the server. See [Configuring InnoDB Buffer Pool Size Online](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-buffer-pool-online-resize) for related information.

* **[Innodb\_buffer\_pool\_wait\_free](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_wait_free)**

Normally, writes to the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool) happen in the background. When **InnoDB** needs to read or create a [page](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) and no clean pages are available, **InnoDB** flushes some [dirty pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_dirty_page) first and waits for that operation to finish. This counter counts instances of these waits. If [**innodb\_buffer\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_buffer_pool_size) has been set properly, this value should be small.

* **[Innodb\_buffer\_pool\_write\_requests](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_buffer_pool_write_requests)**

The number of writes done to the **InnoDB** [buffer pool](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_buffer_pool).

* **[Innodb\_data\_fsyncs](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_fsyncs)**

The number of **fsync()** operations so far. The frequency of **fsync()** calls is influenced by the setting of the [**innodb\_flush\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_method) configuration option.

* **[Innodb\_data\_pending\_fsyncs](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_pending_fsyncs)**

The current number of pending **fsync()** operations. The frequency of **fsync()** calls is influenced by the setting of the [**innodb\_flush\_method**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_flush_method) configuration option.

* **[Innodb\_data\_pending\_reads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_pending_reads)**

The current number of pending reads.

* **[Innodb\_data\_pending\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_pending_writes)**

The current number of pending writes.

* **[Innodb\_data\_read](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_read)**

The amount of data read since the server was started (in bytes).

* **[Innodb\_data\_reads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_reads)**

The total number of data reads (OS file reads).

* **[Innodb\_data\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_writes)**

The total number of data writes.

* **[Innodb\_data\_written](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_data_written)**

The amount of data written so far, in bytes.

* **[Innodb\_dblwr\_pages\_written](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_dblwr_pages_written)**

The number of [pages](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_page) that have been written to the [doublewrite buffer](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_doublewrite_buffer). See [Section 15.11.1, “InnoDB Disk I/O”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-disk-io).

* **[Innodb\_dblwr\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_dblwr_writes)**

The number of doublewrite operations that have been performed. See [Section 15.11.1, “InnoDB Disk I/O”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-disk-io).

* **[Innodb\_have\_atomic\_builtins](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_have_atomic_builtins)**

Indicates whether the server was built with [atomic instructions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_atomic_instruction).

* **[Innodb\_log\_waits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_log_waits)**

The number of times that the [log buffer](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_log_buffer) was too small and a [wait](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_wait) was required for it to be [flushed](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_flush) before continuing.

* **[Innodb\_log\_write\_requests](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_log_write_requests)**

The number of write requests for the **InnoDB** [redo log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_redo_log).

* **[Innodb\_log\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_log_writes)**

The number of physical writes to the **InnoDB** [redo log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_redo_log) file.

* **[Innodb\_num\_open\_files](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_num_open_files)**

The number of files **InnoDB** currently holds open.

* **[Innodb\_os\_log\_fsyncs](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_os_log_fsyncs)**

The number of **fsync()** writes done to the **InnoDB** [redo log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_redo_log) files.

* **[Innodb\_os\_log\_pending\_fsyncs](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_os_log_pending_fsyncs)**

The number of pending **fsync()** operations for the **InnoDB** [redo log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_redo_log) files.

* **[Innodb\_os\_log\_pending\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_os_log_pending_writes)**

The number of pending writes to the **InnoDB** [redo log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_redo_log) files.

* **[Innodb\_os\_log\_written](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_os_log_written)**

The number of bytes written to the **InnoDB** [redo log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_redo_log) files.

* **[Innodb\_page\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_page_size)**

**InnoDB** page size (default 16KB). Many values are counted in pages; the page size enables them to be easily converted to bytes.

* **[Innodb\_pages\_created](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_pages_created)**

The number of pages created by operations on **InnoDB** tables.

* **[Innodb\_pages\_read](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_pages_read)**

The number of pages read from the **InnoDB** buffer pool by operations on **InnoDB** tables.

* **[Innodb\_pages\_written](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_pages_written)**

The number of pages written by operations on **InnoDB** tables.

* **[Innodb\_redo\_log\_enabled](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_redo_log_enabled)**

Whether redo logging is enabled or disabled. Introduced in MySQL 8.0.21.

See [Disabling Redo Logging](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-disable-redo-logging).

* **[Innodb\_row\_lock\_current\_waits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_row_lock_current_waits)**

The number of [row locks](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_row_lock) currently being waited for by operations on **InnoDB** tables.

* **[Innodb\_row\_lock\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_row_lock_time)**

The total time spent in acquiring [row locks](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_row_lock) for **InnoDB** tables, in milliseconds.

* **[Innodb\_row\_lock\_time\_avg](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_row_lock_time_avg)**

The average time to acquire a [row lock](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_row_lock) for **InnoDB** tables, in milliseconds.

* **[Innodb\_row\_lock\_time\_max](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_row_lock_time_max)**

The maximum time to acquire a [row lock](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_row_lock) for **InnoDB** tables, in milliseconds.

* **[Innodb\_row\_lock\_waits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_row_lock_waits)**

The number of times operations on **InnoDB** tables had to wait for a [row lock](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\glossary.html#glos_row_lock).

* **[Innodb\_rows\_deleted](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_rows_deleted)**

The number of rows deleted from **InnoDB** tables.

* **[Innodb\_rows\_inserted](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_rows_inserted)**

The number of rows inserted into **InnoDB** tables.

* **[Innodb\_rows\_read](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_rows_read)**

The number of rows read from **InnoDB** tables.

* **[Innodb\_rows\_updated](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_rows_updated)**

The number of rows updated in **InnoDB** tables.

* **[Innodb\_system\_rows\_deleted](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_system_rows_deleted)**

The number of rows deleted from **InnoDB** tables belonging to system-created schemas.

* **[Innodb\_system\_rows\_inserted](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_system_rows_inserted)**

The number of rows inserted into **InnoDB** tables belonging to system-created schemas.

* **[Innodb\_system\_rows\_read](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_system_rows_read)**

The number of rows read from **InnoDB** tables belonging to system-created schemas.

* **[Innodb\_truncated\_status\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_truncated_status_writes)**

The number of times output from the **SHOW ENGINE INNODB STATUS** statement has been truncated.

* **[Innodb\_undo\_tablespaces\_active](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_undo_tablespaces_active)**

The number of active undo tablespaces. Includes both implicit (**InnoDB**-created) and explicit (user-created) undo tablespaces. For information about undo tablespaces, see [Section 15.6.3.4, “Undo Tablespaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-undo-tablespaces).

* **[Innodb\_undo\_tablespaces\_explicit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_undo_tablespaces_explicit)**

The number of user-created undo tablespaces. For information about undo tablespaces, see [Section 15.6.3.4, “Undo Tablespaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-undo-tablespaces).

* **[Innodb\_undo\_tablespaces\_implicit](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_undo_tablespaces_implicit)**

The number of undo tablespaces created by **InnoDB**. Two default undo tablespaces are created by **InnoDB** when the MySQL instance is initialized. For information about undo tablespaces, see [Section 15.6.3.4, “Undo Tablespaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-undo-tablespaces).

* **[Innodb\_undo\_tablespaces\_total](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Innodb_undo_tablespaces_total)**

The total number of undo tablespaces. Includes both implicit (**InnoDB**-created) and explicit (user-created) undo tablespaces, active and inactive. For information about undo tablespaces, see [Section 15.6.3.4, “Undo Tablespaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-undo-tablespaces).

* **[Key\_blocks\_not\_flushed](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_blocks_not_flushed)**

The number of key blocks in the **MyISAM** key cache that have changed but have not yet been flushed to disk.

* **[Key\_blocks\_unused](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_blocks_unused)**

The number of unused blocks in the **MyISAM** key cache. You can use this value to determine how much of the key cache is in use; see the discussion of [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) in [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

* **[Key\_blocks\_used](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_blocks_used)**

The number of used blocks in the **MyISAM** key cache. This value is a high-water mark that indicates the maximum number of blocks that have ever been in use at one time.

* **[Key\_read\_requests](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_read_requests)**

The number of requests to read a key block from the **MyISAM** key cache.

* **[Key\_reads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_reads)**

The number of physical reads of a key block from disk into the **MyISAM** key cache. If [**Key\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_reads) is large, then your [**key\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_key_buffer_size) value is probably too small. The cache miss rate can be calculated as [**Key\_reads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_reads)/[**Key\_read\_requests**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Key_read_requests).

* **[Key\_write\_requests](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_write_requests)**

The number of requests to write a key block to the **MyISAM** key cache.

* **[Key\_writes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Key_writes)**

The number of physical writes of a key block from the **MyISAM** key cache to disk.

* **[Last\_query\_cost](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Last_query_cost)**

The total cost of the last compiled query as computed by the query optimizer. This is useful for comparing the cost of different query plans for the same query. The default value of 0 means that no query has been compiled yet. The default value is 0. [**Last\_query\_cost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Last_query_cost) has session scope.

In MySQL 8.0.16 and later, this variable shows the cost of queries that have multiple query blocks, summing the cost estimates of each query block, estimating how many times non-cacheable subqueries are executed, and multiplying the cost of those query blocks by the number of subquery executions. (Bug #92766, Bug #28786951) Prior to MySQL 8.0.16, **Last\_query\_cost** was computed accurately only for simple, “flat” queries, but not for complex queries such as those containing subqueries or [**UNION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#union). (For the latter, the value was set to 0.)

* **[Last\_query\_partial\_plans](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Last_query_partial_plans)**

The number of iterations the query optimizer made in execution plan construction for the previous query. [**Last\_query\_cost**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Last_query_cost) has session scope.

* **[Locked\_connects](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Locked_connects)**

The number of attempts to connect to locked user accounts. For information about account locking and unlocking, see [Section 6.2.19, “Account Locking”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#account-locking).

* **[Max\_execution\_time\_exceeded](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Max_execution_time_exceeded)**

The number of [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements for which the execution timeout was exceeded.

* **[Max\_execution\_time\_set](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Max_execution_time_set)**

The number of [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements for which a nonzero execution timeout was set. This includes statements that include a nonzero [**MAX\_EXECUTION\_TIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-execution-time) optimizer hint, and statements that include no such hint but execute while the timeout indicated by the [**max\_execution\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_execution_time) system variable is nonzero.

* **[Max\_execution\_time\_set\_failed](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Max_execution_time_set_failed)**

The number of [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements for which the attempt to set an execution timeout failed.

* **[Max\_used\_connections](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Max_used_connections)**

The maximum number of connections that have been in use simultaneously since the server started.

* **[Max\_used\_connections\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Max_used_connections_time)**

The time at which [**Max\_used\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Max_used_connections) reached its current value.

* **[Not\_flushed\_delayed\_rows](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Not_flushed_delayed_rows)**

This status variable is deprecated (because **DELAYED** inserts are not supported); expect it to be removed in a future release.

* **[mecab\_charset](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_mecab_charset)**

The character set currently used by the MeCab full-text parser plugin. For related information, see [Section 12.10.9, “MeCab Full-Text Parser Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#fulltext-search-mecab).

* **[Ongoing\_anonymous\_transaction\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ongoing_anonymous_transaction_count)**

Shows the number of ongoing transactions which have been marked as anonymous. This can be used to ensure that no further transactions are waiting to be processed.

* **[Ongoing\_anonymous\_gtid\_violating\_transaction\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ongoing_anonymous_gtid_violating_transaction_count)**

This status variable is only available in debug builds. Shows the number of ongoing transactions which use [**gtid\_next=ANONYMOUS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_next) and that violate GTID consistency.

* **[Ongoing\_automatic\_gtid\_violating\_transaction\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ongoing_automatic_gtid_violating_transaction_count)**

This status variable is only available in debug builds. Shows the number of ongoing transactions which use [**gtid\_next=AUTOMATIC**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_next) and that violate GTID consistency.

* **[Open\_files](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Open_files)**

The number of files that are open. This count includes regular files opened by the server. It does not include other types of files such as sockets or pipes. Also, the count does not include files that storage engines open using their own internal functions rather than asking the server level to do so.

* **[Open\_streams](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Open_streams)**

The number of streams that are open (used mainly for logging).

* **[Open\_table\_definitions](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Open_table_definitions)**

The number of cached table definitions.

* **[Open\_tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Open_tables)**

The number of tables that are open.

* **[Opened\_files](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Opened_files)**

The number of files that have been opened with my\_open() (a **mysys** library function). Parts of the server that open files without using this function do not increment the count.

* **[Opened\_table\_definitions](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Opened_table_definitions)**

The number of table definitions that have been cached.

* **[Opened\_tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Opened_tables)**

The number of tables that have been opened. If [**Opened\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Opened_tables) is big, your [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) value is probably too small.

* **Performance\_schema\_*xxx***

Performance Schema status variables are listed in [Section 27.16, “Performance Schema Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-status-variables). These variables provide information about instrumentation that could not be loaded or created due to memory constraints.

* **[Prepared\_stmt\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Prepared_stmt_count)**

The current number of prepared statements. (The maximum number of statements is given by the [**max\_prepared\_stmt\_count**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_prepared_stmt_count) system variable.)

* **[Queries](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Queries)**

The number of statements executed by the server. This variable includes statements executed within stored programs, unlike the [**Questions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Questions) variable. It does not count **COM\_PING** or **COM\_STATISTICS** commands.

The discussion at the beginning of this section indicates how to relate this statement-counting status variable to other such variables.

* **[Questions](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Questions)**

The number of statements executed by the server. This includes only statements sent to the server by clients and not statements executed within stored programs, unlike the [**Queries**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Queries) variable. This variable does not count **COM\_PING**, **COM\_STATISTICS**, **COM\_STMT\_PREPARE**, **COM\_STMT\_CLOSE**, or **COM\_STMT\_RESET** commands.

The discussion at the beginning of this section indicates how to relate this statement-counting status variable to other such variables.

* **[Rpl\_semi\_sync\_master\_clients](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_clients)**

The number of semisynchronous replicas.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_net\_avg\_wait\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_net_avg_wait_time)**

The average time in microseconds the source waited for a replica reply. This variable is always **0**, and is deprecated; expect it to be removed in a future version.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_net\_wait\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_net_wait_time)**

The total time in microseconds the source waited for replica replies. This variable is always **0**, and is deprecated; expect it to be removed in a future version.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_net\_waits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_net_waits)**

The total number of times the source waited for replica replies.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_no\_times](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_no_times)**

The number of times the source turned off semisynchronous replication.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_no\_tx](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_no_tx)**

The number of commits that were not acknowledged successfully by a replica.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_status)**

Whether semisynchronous replication currently is operational on the source. The value is **ON** if the plugin has been enabled and a commit acknowledgment has occurred. It is **OFF** if the plugin is not enabled or the source has fallen back to asynchronous replication due to commit acknowledgment timeout.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_timefunc\_failures](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_timefunc_failures)**

The number of times the source failed when calling time functions such as **gettimeofday()**.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_tx\_avg\_wait\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_tx_avg_wait_time)**

The average time in microseconds the source waited for each transaction.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_tx\_wait\_time](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_tx_wait_time)**

The total time in microseconds the source waited for transactions.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_tx\_waits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_tx_waits)**

The total number of times the source waited for transactions.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_wait\_pos\_backtraverse](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_wait_pos_backtraverse)**

The total number of times the source waited for an event with binary coordinates lower than events waited for previously. This can occur when the order in which transactions start waiting for a reply is different from the order in which their binary log events are written.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_wait\_sessions](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_wait_sessions)**

The number of sessions currently waiting for replica replies.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_master\_yes\_tx](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_master_yes_tx)**

The number of commits that were acknowledged successfully by a replica.

This variable is available only if the source-side semisynchronous replication plugin is installed.

* **[Rpl\_semi\_sync\_slave\_status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rpl_semi_sync_slave_status)**

Whether semisynchronous replication currently is operational on the replica. This is **ON** if the plugin has been enabled and the replication I/O thread is running, **OFF** otherwise.

This variable is available only if the replica-side semisynchronous replication plugin is installed.

* **[Rsa\_public\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rsa_public_key)**

The value of this variable is the public key used by the **sha256\_password** authentication plugin for RSA key pair-based password exchange. The value is nonempty only if the server successfully initializes the private and public keys in the files named by the [**sha256\_password\_private\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_private_key_path) and [**sha256\_password\_public\_key\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sha256_password_public_key_path) system variables. The value of [**Rsa\_public\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rsa_public_key) comes from the latter file.

For information about **sha256\_password**, see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#sha256-pluggable-authentication).

* **[Secondary\_engine\_execution\_count](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Secondary_engine_execution_count)**

The number of queries offloaded to a secondary engine. This variable was added in MySQL 8.0.13.

For use with HeatWave. See [HeatWave User Guide](https://dev.mysql.com/doc/heatwave/en/).

* **[Select\_full\_join](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Select_full_join)**

The number of joins that perform table scans because they do not use indexes. If this value is not 0, you should carefully check the indexes of your tables.

* **[Select\_full\_range\_join](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Select_full_range_join)**

The number of joins that used a range search on a reference table.

* **[Select\_range](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Select_range)**

The number of joins that used ranges on the first table. This is normally not a critical issue even if the value is quite large.

* **[Select\_range\_check](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Select_range_check)**

The number of joins without keys that check for key usage after each row. If this is not 0, you should carefully check the indexes of your tables.

* **[Select\_scan](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Select_scan)**

The number of joins that did a full scan of the first table.

* **[Slave\_open\_temp\_tables](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Slave_open_temp_tables)**

The number of temporary tables that the replication SQL thread currently has open. If the value is greater than zero, it is not safe to shut down the replica; see [Section 17.5.1.31, “Replication and Temporary Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-temptables). This variable reports the total count of open temporary tables for all replication channels.

* **[Slave\_rows\_last\_search\_algorithm\_used](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Slave_rows_last_search_algorithm_used)**

The search algorithm that was most recently used by this replica to locate rows for row-based replication. The result shows whether the replica used indexes, a table scan, or hashing as the search algorithm for the last transaction executed on any channel.

The method used depends on the setting for the [**slave\_rows\_search\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_rows_search_algorithms) system variable, and the keys that are available on the relevant table.

This variable is available only for debug builds of MySQL.

* **[Slow\_launch\_threads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Slow_launch_threads)**

The number of threads that have taken more than [**slow\_launch\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_launch_time) seconds to create.

* **[Slow\_queries](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Slow_queries)**

The number of queries that have taken more than [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) seconds. This counter increments regardless of whether the slow query log is enabled. For information about that log, see [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log).

* **[Sort\_merge\_passes](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Sort_merge_passes)**

The number of merge passes that the sort algorithm has had to do. If this value is large, you should consider increasing the value of the [**sort\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sort_buffer_size) system variable.

* **[Sort\_range](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Sort_range)**

The number of sorts that were done using ranges.

* **[Sort\_rows](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Sort_rows)**

The number of sorted rows.

* **[Sort\_scan](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Sort_scan)**

The number of sorts that were done by scanning the table.

* **[Ssl\_accept\_renegotiates](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_accept_renegotiates)**

The number of negotiates needed to establish the connection.

* **[Ssl\_accepts](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_accepts)**

The number of accepted SSL connections.

* **[Ssl\_callback\_cache\_hits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_callback_cache_hits)**

The number of callback cache hits.

* **[Ssl\_cipher](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_cipher)**

The current encryption cipher (empty for unencrypted connections).

* **[Ssl\_cipher\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_cipher_list)**

The list of possible SSL ciphers (empty for non-SSL connections). If MySQL supports TLSv1.3, the value includes the possible TLSv1.3 ciphersuites. See [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-protocols-ciphers).

* **[Ssl\_client\_connects](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_client_connects)**

The number of SSL connection attempts to an SSL-enabled replication source server.

* **[Ssl\_connect\_renegotiates](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_connect_renegotiates)**

The number of negotiates needed to establish the connection to an SSL-enabled replication source server.

* **[Ssl\_ctx\_verify\_depth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_ctx_verify_depth)**

The SSL context verification depth (how many certificates in the chain are tested).

* **[Ssl\_ctx\_verify\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_ctx_verify_mode)**

The SSL context verification mode.

* **[Ssl\_default\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_default_timeout)**

The default SSL timeout.

* **[Ssl\_finished\_accepts](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_finished_accepts)**

The number of successful SSL connections to the server.

* **[Ssl\_finished\_connects](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_finished_connects)**

The number of successful replica connections to an SSL-enabled replication source server.

* **[Ssl\_server\_not\_after](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_server_not_after)**

The last date for which the SSL certificate is valid. To check SSL certificate expiration information, use this statement:

mysql> **SHOW STATUS LIKE 'Ssl\_server\_not%';**

+-----------------------+--------------------------+

| Variable\_name | Value |

+-----------------------+--------------------------+

| Ssl\_server\_not\_after | Apr 28 14:16:39 2025 GMT |

| Ssl\_server\_not\_before | May 1 14:16:39 2015 GMT |

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* **[Ssl\_server\_not\_before](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_server_not_before)**

The first date for which the SSL certificate is valid.

* **[Ssl\_session\_cache\_hits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_session_cache_hits)**

The number of SSL session cache hits.

* **[Ssl\_session\_cache\_misses](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_session_cache_misses)**

The number of SSL session cache misses.

* **[Ssl\_session\_cache\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_session_cache_mode)**

The SSL session cache mode.

* **[Ssl\_session\_cache\_overflows](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_session_cache_overflows)**

The number of SSL session cache overflows.

* **[Ssl\_session\_cache\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_session_cache_size)**

The SSL session cache size.

* **[Ssl\_session\_cache\_timeouts](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_session_cache_timeouts)**

The number of SSL session cache timeouts.

* **[Ssl\_sessions\_reused](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_sessions_reused)**

How many SSL connections were reused from the cache.

* **[Ssl\_used\_session\_cache\_entries](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_used_session_cache_entries)**

How many SSL session cache entries were used.

* **[Ssl\_verify\_depth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_verify_depth)**

The verification depth for replication SSL connections.

* **[Ssl\_verify\_mode](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_verify_mode)**

The verification mode used by the server for a connection that uses SSL. The value is a bitmask; bits are defined in the openssl/ssl.h header file:

# define SSL\_VERIFY\_NONE 0x00

# define SSL\_VERIFY\_PEER 0x01

# define SSL\_VERIFY\_FAIL\_IF\_NO\_PEER\_CERT 0x02

# define SSL\_VERIFY\_CLIENT\_ONCE 0x04

**SSL\_VERIFY\_PEER** indicates that the server asks for a client certificate. If the client supplies one, the server performs verification and proceeds only if verification is successful. **SSL\_VERIFY\_CLIENT\_ONCE** indicates that a request for the client certificate is performed only in the initial handshake.

* **[Ssl\_version](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Ssl_version)**

The SSL protocol version of the connection (for example, TLSv1). If the connection is not encrypted, the value is empty.

* **[Table\_locks\_immediate](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Table_locks_immediate)**

The number of times that a request for a table lock could be granted immediately.

* **[Table\_locks\_waited](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Table_locks_waited)**

The number of times that a request for a table lock could not be granted immediately and a wait was needed. If this is high and you have performance problems, you should first optimize your queries, and then either split your table or tables or use replication.

* **[Table\_open\_cache\_hits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Table_open_cache_hits)**

The number of hits for open tables cache lookups.

* **[Table\_open\_cache\_misses](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Table_open_cache_misses)**

The number of misses for open tables cache lookups.

* **[Table\_open\_cache\_overflows](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Table_open_cache_overflows)**

The number of overflows for the open tables cache. This is the number of times, after a table is opened or closed, a cache instance has an unused entry and the size of the instance is larger than [**table\_open\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache) / [**table\_open\_cache\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache_instances).

* **[Tc\_log\_max\_pages\_used](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Tc_log_max_pages_used)**

For the memory-mapped implementation of the log that is used by [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) when it acts as the transaction coordinator for recovery of internal XA transactions, this variable indicates the largest number of pages used for the log since the server started. If the product of [**Tc\_log\_max\_pages\_used**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_max_pages_used) and [**Tc\_log\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_page_size) is always significantly less than the log size, the size is larger than necessary and can be reduced. (The size is set by the [--log-tc-size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-tc-size) option. This variable is unused: It is unneeded for binary log-based recovery, and the memory-mapped recovery log method is not used unless the number of storage engines that are capable of two-phase commit and that support XA transactions is greater than one. (**InnoDB** is the only applicable engine.)

* **[Tc\_log\_page\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Tc_log_page_size)**

The page size used for the memory-mapped implementation of the XA recovery log. The default value is determined using **getpagesize()**. This variable is unused for the same reasons as described for [**Tc\_log\_max\_pages\_used**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Tc_log_max_pages_used).

* **[Tc\_log\_page\_waits](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Tc_log_page_waits)**

For the memory-mapped implementation of the recovery log, this variable increments each time the server was not able to commit a transaction and had to wait for a free page in the log. If this value is large, you might want to increase the log size (with the [--log-tc-size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-tc-size) option). For binary log-based recovery, this variable increments each time the binary log cannot be closed because there are two-phase commits in progress. (The close operation waits until all such transactions are finished.)

* **[Threads\_cached](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Threads_cached)**

The number of threads in the thread cache.

* **[Threads\_connected](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Threads_connected)**

The number of currently open connections.

* **[Threads\_created](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Threads_created)**

The number of threads created to handle connections. If [**Threads\_created**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_created) is big, you may want to increase the [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) value. The cache miss rate can be calculated as [**Threads\_created**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_created)/[**Connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connections).

* **[Threads\_running](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Threads_running)**

The number of threads that are not sleeping.

* **[Uptime](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Uptime)**

The number of seconds that the server has been up.

* **[Uptime\_since\_flush\_status](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Uptime_since_flush_status)**

The number of seconds since the most recent **FLUSH STATUS** statement.

### 5.1.11 服务端SQL模式

The MySQL server can operate in different SQL modes, and can apply these modes differently for different clients, depending on the value of the [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) system variable. DBAs can set the global SQL mode to match site server operating requirements, and each application can set its session SQL mode to its own requirements.

Modes affect the SQL syntax MySQL supports and the data validation checks it performs. This makes it easier to use MySQL in different environments and to use MySQL together with other database servers.

* [Setting the SQL Mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-setting)
* [The Most Important SQL Modes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-important)
* [Full List of SQL Modes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-full)
* [Combination SQL Modes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-combo)
* [Strict SQL Mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-strict)
* [Comparison of the IGNORE Keyword and Strict SQL Mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ignore-strict-comparison)

For answers to questions often asked about server SQL modes in MySQL, see [Section A.3, “MySQL 8.0 FAQ: Server SQL Mode”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\faqs.html#faqs-sql-modes).

When working with **InnoDB** tables, consider also the [**innodb\_strict\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_strict_mode) system variable. It enables additional error checks for **InnoDB** tables.

#### Setting the SQL Mode

The default SQL mode in MySQL 8.0 includes these modes: [**ONLY\_FULL\_GROUP\_BY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_only_full_group_by), [**STRICT\_TRANS\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_trans_tables), [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date), [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date), [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero), and [**NO\_ENGINE\_SUBSTITUTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_engine_substitution).

To set the SQL mode at server startup, use the [--sql-mode="***modes***"](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) option on the command line, or [sql-mode="***modes***"](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) in an option file such as my.cnf (Unix operating systems) or my.ini (Windows). ***modes*** is a list of different modes separated by commas. To clear the SQL mode explicitly, set it to an empty string using [--sql-mode=""](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) on the command line, or [sql-mode=""](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_sql-mode) in an option file.

**Note**

MySQL installation programs may configure the SQL mode during the installation process.

If the SQL mode differs from the default or from what you expect, check for a setting in an option file that the server reads at startup.

To change the SQL mode at runtime, set the global or session [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) system variable using a [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement:

SET GLOBAL sql\_mode = '***modes***';

SET SESSION sql\_mode = '***modes***';

Setting the **GLOBAL** variable requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege) and affects the operation of all clients that connect from that time on. Setting the **SESSION** variable affects only the current client. Each client can change its session [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) value at any time.

To determine the current global or session [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) setting, select its value:

SELECT @@GLOBAL.sql\_mode;

SELECT @@SESSION.sql\_mode;

**Important**

**SQL mode and user-defined partitioning.** Changing the server SQL mode after creating and inserting data into partitioned tables can cause major changes in the behavior of such tables, and could lead to loss or corruption of data. It is strongly recommended that you never change the SQL mode once you have created tables employing user-defined partitioning.

When replicating partitioned tables, differing SQL modes on the source and replica can also lead to problems. For best results, you should always use the same server SQL mode on the source and replica.

For more information, see [Section 24.6, “Restrictions and Limitations on Partitioning”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\partitioning.html#partitioning-limitations).

#### The Most Important SQL Modes

The most important [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) values are probably these:

* **[ANSI](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_ansi)**

This mode changes syntax and behavior to conform more closely to standard SQL. It is one of the special [combination modes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-combo) listed at the end of this section.

* **[STRICT\_TRANS\_TABLES](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_strict_trans_tables)**

If a value could not be inserted as given into a transactional table, abort the statement. For a nontransactional table, abort the statement if the value occurs in a single-row statement or the first row of a multiple-row statement. More details are given later in this section.

* **[TRADITIONAL](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_traditional)**

Make MySQL behave like a “traditional” SQL database system. A simple description of this mode is “give an error instead of a warning” when inserting an incorrect value into a column. It is one of the special [combination modes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-combo) listed at the end of this section.

**Note**

With [**TRADITIONAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_traditional) mode enabled, an [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) or [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) aborts as soon as an error occurs. If you are using a nontransactional storage engine, this may not be what you want because data changes made prior to the error may not be rolled back, resulting in a “partially done” update.

When this manual refers to “strict mode,” it means a mode with either or both [**STRICT\_TRANS\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_trans_tables) or [**STRICT\_ALL\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_all_tables) enabled.

#### Full List of SQL Modes

The following list describes all supported SQL modes:

* **[ALLOW\_INVALID\_DATES](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_allow_invalid_dates)**

Do not perform full checking of dates. Check only that the month is in the range from 1 to 12 and the day is in the range from 1 to 31. This may be useful for Web applications that obtain year, month, and day in three different fields and store exactly what the user inserted, without date validation. This mode applies to [**DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) and [**DATETIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns. It does not apply [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns, which always require a valid date.

With [**ALLOW\_INVALID\_DATES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_allow_invalid_dates) disabled, the server requires that month and day values be legal, and not merely in the range 1 to 12 and 1 to 31, respectively. With strict mode disabled, invalid dates such as **'2004-04-31'** are converted to **'0000-00-00'** and a warning is generated. With strict mode enabled, invalid dates generate an error. To permit such dates, enable [**ALLOW\_INVALID\_DATES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_allow_invalid_dates).

* **[ANSI\_QUOTES](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_ansi_quotes)**

Treat **"** as an identifier quote character (like the **`** quote character) and not as a string quote character. You can still use **`** to quote identifiers with this mode enabled. With [**ANSI\_QUOTES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ansi_quotes) enabled, you cannot use double quotation marks to quote literal strings because they are interpreted as identifiers.

* **[ERROR\_FOR\_DIVISION\_BY\_ZERO](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_error_for_division_by_zero)**

The [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero) mode affects handling of division by zero, which includes [**MOD(*N*,0)**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_mod). For data-change operations ([**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update)), its effect also depends on whether strict SQL mode is enabled.

* + If this mode is not enabled, division by zero inserts **NULL** and produces no warning.
  + If this mode is enabled, division by zero inserts **NULL** and produces a warning.
  + If this mode and strict mode are enabled, division by zero produces an error, unless **IGNORE** is given as well. For **INSERT IGNORE** and **UPDATE IGNORE**, division by zero inserts **NULL** and produces a warning.

For [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select), division by zero returns **NULL**. Enabling [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero) causes a warning to be produced as well, regardless of whether strict mode is enabled.

[**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero) is deprecated. [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero) is not part of strict mode, but should be used in conjunction with strict mode and is enabled by default. A warning occurs if [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero) is enabled without also enabling strict mode or vice versa.

Because [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero) is deprecated, you should expect it to be removed in a future MySQL release as a separate mode name and its effect included in the effects of strict SQL mode.

* **[HIGH\_NOT\_PRECEDENCE](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_high_not_precedence)**

The precedence of the [**NOT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_not) operator is such that expressions such as **NOT a BETWEEN b AND c** are parsed as **NOT (a BETWEEN b AND c)**. In some older versions of MySQL, the expression was parsed as **(NOT a) BETWEEN b AND c**. The old higher-precedence behavior can be obtained by enabling the [**HIGH\_NOT\_PRECEDENCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_high_not_precedence) SQL mode.

mysql> **SET sql\_mode = '';**

mysql> **SELECT NOT 1 BETWEEN -5 AND 5;**

-> 0

mysql> **SET sql\_mode = 'HIGH\_NOT\_PRECEDENCE';**

mysql> **SELECT NOT 1 BETWEEN -5 AND 5;**

-> 1

* **[IGNORE\_SPACE](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_ignore_space)**

Permit spaces between a function name and the **(** character. This causes built-in function names to be treated as reserved words. As a result, identifiers that are the same as function names must be quoted as described in [Section 9.2, “Schema Object Names”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\language-structure.html#identifiers). For example, because there is a [**COUNT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_count) function, the use of **count** as a table name in the following statement causes an error:

mysql> **CREATE TABLE count (i INT);**

ERROR 1064 (42000): You have an error in your SQL syntax

The table name should be quoted:

mysql> **CREATE TABLE `count` (i INT);**

Query OK, 0 rows affected (0.00 sec)

The [**IGNORE\_SPACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ignore_space) SQL mode applies to built-in functions, not to loadable functions or stored functions. It is always permissible to have spaces after a loadable function or stored function name, regardless of whether [**IGNORE\_SPACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ignore_space) is enabled.

For further discussion of [**IGNORE\_SPACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ignore_space), see [Section 9.2.5, “Function Name Parsing and Resolution”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\language-structure.html#function-resolution).

* **[NO\_AUTO\_VALUE\_ON\_ZERO](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_auto_value_on_zero)**

**[NO\_AUTO\_VALUE\_ON\_ZERO](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_auto_value_on_zero)** affects handling of **AUTO\_INCREMENT** columns. Normally, you generate the next sequence number for the column by inserting either **NULL** or **0** into it. [**NO\_AUTO\_VALUE\_ON\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_auto_value_on_zero) suppresses this behavior for **0** so that only **NULL** generates the next sequence number.

This mode can be useful if **0** has been stored in a table's **AUTO\_INCREMENT** column. (Storing **0** is not a recommended practice, by the way.) For example, if you dump the table with [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) and then reload it, MySQL normally generates new sequence numbers when it encounters the **0** values, resulting in a table with contents different from the one that was dumped. Enabling [**NO\_AUTO\_VALUE\_ON\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_auto_value_on_zero) before reloading the dump file solves this problem. For this reason, [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) automatically includes in its output a statement that enables [**NO\_AUTO\_VALUE\_ON\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_auto_value_on_zero).

* **[NO\_BACKSLASH\_ESCAPES](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_backslash_escapes)**

Enabling this mode disables the use of the backslash character (**\**) as an escape character within strings and identifiers. With this mode enabled, backslash becomes an ordinary character like any other, and the default escape sequence for [**LIKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_like) expressions is changed so that no escape character is used.

* **[NO\_DIR\_IN\_CREATE](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_dir_in_create)**

When creating a table, ignore all **INDEX DIRECTORY** and **DATA DIRECTORY** directives. This option is useful on replica servers.

* **[NO\_ENGINE\_SUBSTITUTION](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_engine_substitution)**

Control automatic substitution of the default storage engine when a statement such as [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) or [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) specifies a storage engine that is disabled or not compiled in.

By default, [**NO\_ENGINE\_SUBSTITUTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_engine_substitution) is enabled.

Because storage engines can be pluggable at runtime, unavailable engines are treated the same way:

With [**NO\_ENGINE\_SUBSTITUTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_engine_substitution) disabled, for [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) the default engine is used and a warning occurs if the desired engine is unavailable. For [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), a warning occurs and the table is not altered.

With [**NO\_ENGINE\_SUBSTITUTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_engine_substitution) enabled, an error occurs and the table is not created or altered if the desired engine is unavailable.

* **[NO\_UNSIGNED\_SUBTRACTION](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_unsigned_subtraction)**

Subtraction between integer values, where one is of type **UNSIGNED**, produces an unsigned result by default. If the result would otherwise have been negative, an error results:

mysql> **SET sql\_mode = '';**

Query OK, 0 rows affected (0.00 sec)

mysql> **SELECT CAST(0 AS UNSIGNED) - 1;**

ERROR 1690 (22003): BIGINT UNSIGNED value is out of range in '(cast(0 as unsigned) - 1)'

If the [**NO\_UNSIGNED\_SUBTRACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_unsigned_subtraction) SQL mode is enabled, the result is negative:

mysql> **SET sql\_mode = 'NO\_UNSIGNED\_SUBTRACTION';**

mysql> **SELECT CAST(0 AS UNSIGNED) - 1;**

+-------------------------+

| CAST(0 AS UNSIGNED) - 1 |

+-------------------------+

| -1 |

+-------------------------+

If the result of such an operation is used to update an **UNSIGNED** integer column, the result is clipped to the maximum value for the column type, or clipped to 0 if [**NO\_UNSIGNED\_SUBTRACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_unsigned_subtraction) is enabled. With strict SQL mode enabled, an error occurs and the column remains unchanged.

When [**NO\_UNSIGNED\_SUBTRACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_unsigned_subtraction) is enabled, the subtraction result is signed, even if any operand is unsigned. For example, compare the type of column **c2** in table **t1** with that of column **c2** in table **t2**:

mysql> **SET sql\_mode='';**

mysql> **CREATE TABLE test (c1 BIGINT UNSIGNED NOT NULL);**

mysql> **CREATE TABLE t1 SELECT c1 - 1 AS c2 FROM test;**

mysql> **DESCRIBE t1;**

+-------+---------------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+-------+---------------------+------+-----+---------+-------+

| c2 | bigint(21) unsigned | NO | | 0 | |

+-------+---------------------+------+-----+---------+-------+

mysql> **SET sql\_mode='NO\_UNSIGNED\_SUBTRACTION';**

mysql> **CREATE TABLE t2 SELECT c1 - 1 AS c2 FROM test;**

mysql> **DESCRIBE t2;**

+-------+------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+-------+------------+------+-----+---------+-------+

| c2 | bigint(21) | NO | | 0 | |

+-------+------------+------+-----+---------+-------+

This means that **BIGINT UNSIGNED** is not 100% usable in all contexts. See [Section 12.11, “Cast Functions and Operators”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#cast-functions).

* **[NO\_ZERO\_DATE](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_zero_date)**

The [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) mode affects whether the server permits **'0000-00-00'** as a valid date. Its effect also depends on whether strict SQL mode is enabled.

* + If this mode is not enabled, **'0000-00-00'** is permitted and inserts produce no warning.
  + If this mode is enabled, **'0000-00-00'** is permitted and inserts produce a warning.
  + If this mode and strict mode are enabled, **'0000-00-00'** is not permitted and inserts produce an error, unless **IGNORE** is given as well. For **INSERT IGNORE** and **UPDATE IGNORE**, **'0000-00-00'** is permitted and inserts produce a warning.

[**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) is deprecated. [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) is not part of strict mode, but should be used in conjunction with strict mode and is enabled by default. A warning occurs if [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) is enabled without also enabling strict mode or vice versa.

Because [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) is deprecated, you should expect it to be removed in a future MySQL release as a separate mode name and its effect included in the effects of strict SQL mode.

* **[NO\_ZERO\_IN\_DATE](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_no_zero_in_date)**

The [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) mode affects whether the server permits dates in which the year part is nonzero but the month or day part is 0. (This mode affects dates such as **'2010-00-01'** or **'2010-01-00'**, but not **'0000-00-00'**. To control whether the server permits **'0000-00-00'**, use the [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date) mode.) The effect of [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) also depends on whether strict SQL mode is enabled.

* + If this mode is not enabled, dates with zero parts are permitted and inserts produce no warning.
  + If this mode is enabled, dates with zero parts are inserted as **'0000-00-00'** and produce a warning.
  + If this mode and strict mode are enabled, dates with zero parts are not permitted and inserts produce an error, unless **IGNORE** is given as well. For **INSERT IGNORE** and **UPDATE IGNORE**, dates with zero parts are inserted as **'0000-00-00'** and produce a warning.

[**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) is deprecated. [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) is not part of strict mode, but should be used in conjunction with strict mode and is enabled by default. A warning occurs if [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) is enabled without also enabling strict mode or vice versa.

Because [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) is deprecated, you should expect it to be removed in a future MySQL release as a separate mode name and its effect included in the effects of strict SQL mode.

* **[ONLY\_FULL\_GROUP\_BY](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_only_full_group_by)**

Reject queries for which the select list, **HAVING** condition, or **ORDER BY** list refer to nonaggregated columns that are neither named in the **GROUP BY** clause nor are functionally dependent on (uniquely determined by) **GROUP BY** columns.

A MySQL extension to standard SQL permits references in the **HAVING** clause to aliased expressions in the select list. The **HAVING** clause can refer to aliases regardless of whether [**ONLY\_FULL\_GROUP\_BY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_only_full_group_by) is enabled.

For additional discussion and examples, see [Section 12.20.3, “MySQL Handling of GROUP BY”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#group-by-handling).

* **[PAD\_CHAR\_TO\_FULL\_LENGTH](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_pad_char_to_full_length)**

By default, trailing spaces are trimmed from [**CHAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#char) column values on retrieval. If [**PAD\_CHAR\_TO\_FULL\_LENGTH**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_pad_char_to_full_length) is enabled, trimming does not occur and retrieved [**CHAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#char) values are padded to their full length. This mode does not apply to [**VARCHAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#char) columns, for which trailing spaces are retained on retrieval.

**Note**

As of MySQL 8.0.13, [**PAD\_CHAR\_TO\_FULL\_LENGTH**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_pad_char_to_full_length) is deprecated. Expect it to be removed in a future version of MySQL.

mysql> **CREATE TABLE t1 (c1 CHAR(10));**

Query OK, 0 rows affected (0.37 sec)

mysql> **INSERT INTO t1 (c1) VALUES('xy');**

Query OK, 1 row affected (0.01 sec)

mysql> **SET sql\_mode = '';**

Query OK, 0 rows affected (0.00 sec)

mysql> **SELECT c1, CHAR\_LENGTH(c1) FROM t1;**

+------+-----------------+

| c1 | CHAR\_LENGTH(c1) |

+------+-----------------+

| xy | 2 |

+------+-----------------+

1 row in set (0.00 sec)

mysql> **SET sql\_mode = 'PAD\_CHAR\_TO\_FULL\_LENGTH';**

Query OK, 0 rows affected (0.00 sec)

mysql> **SELECT c1, CHAR\_LENGTH(c1) FROM t1;**

+------------+-----------------+

| c1 | CHAR\_LENGTH(c1) |

+------------+-----------------+

| xy | 10 |

+------------+-----------------+

1 row in set (0.00 sec)

* **[PIPES\_AS\_CONCAT](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_pipes_as_concat)**

Treat [**||**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_or) as a string concatenation operator (same as [**CONCAT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_concat)) rather than as a synonym for [**OR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#operator_or).

* **[REAL\_AS\_FLOAT](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_real_as_float)**

Treat [**REAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#floating-point-types) as a synonym for [**FLOAT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#floating-point-types). By default, MySQL treats [**REAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#floating-point-types) as a synonym for [**DOUBLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#floating-point-types).

* **[STRICT\_ALL\_TABLES](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_strict_all_tables)**

Enable strict SQL mode for all storage engines. Invalid data values are rejected. For details, see [Strict SQL Mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-strict).

* **[STRICT\_TRANS\_TABLES](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_strict_trans_tables)**

Enable strict SQL mode for transactional storage engines, and when possible for nontransactional storage engines. For details, see [Strict SQL Mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode-strict).

* **[TIME\_TRUNCATE\_FRACTIONAL](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_time_truncate_fractional)**

Control whether rounding or truncation occurs when inserting a [**TIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#time), [**DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime), or [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) value with a fractional seconds part into a column having the same type but fewer fractional digits. The default behavior is to use rounding. If this mode is enabled, truncation occurs instead. The following sequence of statements illustrates the difference:

CREATE TABLE t (id INT, tval TIME(1));

SET sql\_mode='';

INSERT INTO t (id, tval) VALUES(1, 1.55);

SET sql\_mode='TIME\_TRUNCATE\_FRACTIONAL';

INSERT INTO t (id, tval) VALUES(2, 1.55);

The resulting table contents look like this, where the first value has been subject to rounding and the second to truncation:

mysql> **SELECT id, tval FROM t ORDER BY id;**

+------+------------+

| id | tval |

+------+------------+

| 1 | 00:00:01.6 |

| 2 | 00:00:01.5 |

+------+------------+

See also [Section 11.2.6, “Fractional Seconds in Time Values”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#fractional-seconds).

#### Combination SQL Modes

The following special modes are provided as shorthand for combinations of mode values from the preceding list.

* **[ANSI](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_ansi)**

Equivalent to [**REAL\_AS\_FLOAT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_real_as_float), [**PIPES\_AS\_CONCAT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_pipes_as_concat), [**ANSI\_QUOTES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ansi_quotes), [**IGNORE\_SPACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ignore_space), and [**ONLY\_FULL\_GROUP\_BY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_only_full_group_by).

[**ANSI**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ansi) mode also causes the server to return an error for queries where a set function ***S*** with an outer reference ***S*(*outer\_ref*)** cannot be aggregated in the outer query against which the outer reference has been resolved. This is such a query:

SELECT \* FROM t1 WHERE t1.a IN (SELECT MAX(t1.b) FROM t2 WHERE ...);

Here, [**MAX(t1.b)**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_max) cannot aggregated in the outer query because it appears in the **WHERE** clause of that query. Standard SQL requires an error in this situation. If [**ANSI**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_ansi) mode is not enabled, the server treats ***S*(*outer\_ref*)** in such queries the same way that it would interpret ***S*(*const*)**.

See [Section 1.7, “MySQL Standards Compliance”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#compatibility).

* **[TRADITIONAL](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_traditional)**

**[TRADITIONAL](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sqlmode_traditional)** is equivalent to [**STRICT\_TRANS\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_trans_tables), [**STRICT\_ALL\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_all_tables), [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date), [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date), [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero), and [**NO\_ENGINE\_SUBSTITUTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_engine_substitution).

#### Strict SQL Mode

Strict mode controls how MySQL handles invalid or missing values in data-change statements such as [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) or [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update). A value can be invalid for several reasons. For example, it might have the wrong data type for the column, or it might be out of range. A value is missing when a new row to be inserted does not contain a value for a non-**NULL** column that has no explicit **DEFAULT** clause in its definition. (For a **NULL** column, **NULL** is inserted if the value is missing.) Strict mode also affects DDL statements such as [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table).

If strict mode is not in effect, MySQL inserts adjusted values for invalid or missing values and produces warnings (see [Section 13.7.7.42, “SHOW WARNINGS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings)). In strict mode, you can produce this behavior by using [**INSERT IGNORE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) or [**UPDATE IGNORE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update).

For statements such as [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) that do not change data, invalid values generate a warning in strict mode, not an error.

Strict mode produces an error for attempts to create a key that exceeds the maximum key length. When strict mode is not enabled, this results in a warning and truncation of the key to the maximum key length.

Strict mode does not affect whether foreign key constraints are checked. [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks) can be used for that. (See [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).)

Strict SQL mode is in effect if either [**STRICT\_ALL\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_all_tables) or [**STRICT\_TRANS\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_trans_tables) is enabled, although the effects of these modes differ somewhat:

* For transactional tables, an error occurs for invalid or missing values in a data-change statement when either [**STRICT\_ALL\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_all_tables) or [**STRICT\_TRANS\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_trans_tables) is enabled. The statement is aborted and rolled back.
* For nontransactional tables, the behavior is the same for either mode if the bad value occurs in the first row to be inserted or updated: The statement is aborted and the table remains unchanged. If the statement inserts or modifies multiple rows and the bad value occurs in the second or later row, the result depends on which strict mode is enabled:
  + For [**STRICT\_ALL\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_all_tables), MySQL returns an error and ignores the rest of the rows. However, because the earlier rows have been inserted or updated, the result is a partial update. To avoid this, use single-row statements, which can be aborted without changing the table.
  + For [**STRICT\_TRANS\_TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_strict_trans_tables), MySQL converts an invalid value to the closest valid value for the column and inserts the adjusted value. If a value is missing, MySQL inserts the implicit default value for the column data type. In either case, MySQL generates a warning rather than an error and continues processing the statement. Implicit defaults are described in [Section 11.6, “Data Type Default Values”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#data-type-defaults).

Strict mode affects handling of division by zero, zero dates, and zeros in dates as follows:

* Strict mode affects handling of division by zero, which includes [**MOD(*N*,0)**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_mod):

For data-change operations ([**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update)):

* + If strict mode is not enabled, division by zero inserts **NULL** and produces no warning.
  + If strict mode is enabled, division by zero produces an error, unless **IGNORE** is given as well. For **INSERT IGNORE** and **UPDATE IGNORE**, division by zero inserts **NULL** and produces a warning.

For [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select), division by zero returns **NULL**. Enabling strict mode causes a warning to be produced as well.

* Strict mode affects whether the server permits **'0000-00-00'** as a valid date:
  + If strict mode is not enabled, **'0000-00-00'** is permitted and inserts produce no warning.
  + If strict mode is enabled, **'0000-00-00'** is not permitted and inserts produce an error, unless **IGNORE** is given as well. For **INSERT IGNORE** and **UPDATE IGNORE**, **'0000-00-00'** is permitted and inserts produce a warning.
* Strict mode affects whether the server permits dates in which the year part is nonzero but the month or day part is 0 (dates such as **'2010-00-01'** or **'2010-01-00'**):
  + If strict mode is not enabled, dates with zero parts are permitted and inserts produce no warning.
  + If strict mode is enabled, dates with zero parts are not permitted and inserts produce an error, unless **IGNORE** is given as well. For **INSERT IGNORE** and **UPDATE IGNORE**, dates with zero parts are inserted as **'0000-00-00'** (which is considered valid with **IGNORE**) and produce a warning.

For more information about strict mode with respect to **IGNORE**, see [Comparison of the IGNORE Keyword and Strict SQL Mode](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ignore-strict-comparison).

Strict mode affects handling of division by zero, zero dates, and zeros in dates in conjunction with the [**ERROR\_FOR\_DIVISION\_BY\_ZERO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_error_for_division_by_zero), [**NO\_ZERO\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_date), and [**NO\_ZERO\_IN\_DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_zero_in_date) modes.

#### Comparison of the IGNORE Keyword and Strict SQL Mode

This section compares the effect on statement execution of the **IGNORE** keyword (which downgrades errors to warnings) and strict SQL mode (which upgrades warnings to errors). It describes which statements they affect, and which errors they apply to.

The following table presents a summary comparison of statement behavior when the default is to produce an error versus a warning. An example of when the default is to produce an error is inserting a **NULL** into a **NOT NULL** column. An example of when the default is to produce a warning is inserting a value of the wrong data type into a column (such as inserting the string **'abc'** into an integer column).

| **Operational Mode** | **When Statement Default is Error** | **When Statement Default is Warning** |
| --- | --- | --- |
| **Without IGNORE or strict SQL mode** | Error | Warning |
| **With IGNORE** | Warning | Warning (same as without **IGNORE** or strict SQL mode) |
| **With strict SQL mode** | Error (same as without **IGNORE** or strict SQL mode) | Error |
| **With IGNORE and strict SQL mode** | Warning | Warning |

One conclusion to draw from the table is that when the **IGNORE** keyword and strict SQL mode are both in effect, **IGNORE** takes precedence. This means that, although **IGNORE** and strict SQL mode can be considered to have opposite effects on error handling, they do not cancel when used together.

* [The Effect of IGNORE on Statement Execution](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ignore-effect-on-execution)
* [The Effect of Strict SQL Mode on Statement Execution](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#strict-sql-mode-effect-on-execution)

##### The Effect of IGNORE on Statement Execution

Several statements in MySQL support an optional **IGNORE** keyword. This keyword causes the server to downgrade certain types of errors and generate warnings instead. For a multiple-row statement, downgrading an error to a warning may enable a row to be processed. Otherwise, **IGNORE** causes the statement to skip to the next row instead of aborting. (For nonignorable errors, an error occurs regardless of the **IGNORE** keyword.)

Example: If the table **t** has a primary key column **i** containing unique values, attempting to insert the same value of **i** into multiple rows normally produces a duplicate-key error:

mysql> **CREATE TABLE t (i INT NOT NULL PRIMARY KEY);**

mysql> **INSERT INTO t (i) VALUES(1),(1);**

ERROR 1062 (23000): Duplicate entry '1' for key 't.PRIMARY'

With **IGNORE**, the row containing the duplicate key still is not inserted, but a warning occurs instead of an error:

mysql> **INSERT IGNORE INTO t (i) VALUES(1),(1);**

Query OK, 1 row affected, 1 warning (0.01 sec)

Records: 2 Duplicates: 1 Warnings: 1

mysql> **SHOW WARNINGS;**

+---------+------+-----------------------------------------+

| Level | Code | Message |

+---------+------+-----------------------------------------+

| Warning | 1062 | Duplicate entry '1' for key 't.PRIMARY' |

+---------+------+-----------------------------------------+

1 row in set (0.00 sec)

Example: If the table **t2** has a **NOT NULL** column **id**, attempting to insert **NULL** produces an error in strict SQL mode:

mysql> **CREATE TABLE t2 (id INT NOT NULL);**

mysql> **INSERT INTO t2 (id) VALUES(1),(NULL),(3);**

ERROR 1048 (23000): Column 'id' cannot be null

mysql> **SELECT \* FROM t2;**

Empty set (0.00 sec)

If the SQL mode is not strict, **IGNORE** causes the **NULL** to be inserted as the column implicit default (0 in this case), which enables the row to be handled without skipping it:

mysql> **INSERT INTO t2 (id) VALUES(1),(NULL),(3);**

mysql> **SELECT \* FROM t2;**

+----+

| id |

+----+

| 1 |

| 0 |

| 3 |

+----+

These statements support the **IGNORE** keyword:

* [**CREATE TABLE ... SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table): **IGNORE** does not apply to the [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) or [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) parts of the statement but to inserts into the table of rows produced by the [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select). Rows that duplicate an existing row on a unique key value are discarded.
* [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete): **IGNORE** causes MySQL to ignore errors during the process of deleting rows.
* [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert): With **IGNORE**, rows that duplicate an existing row on a unique key value are discarded. Rows set to values that would cause data conversion errors are set to the closest valid values instead.

For partitioned tables where no partition matching a given value is found, **IGNORE** causes the insert operation to fail silently for rows containing the unmatched value.

* [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data), [**LOAD XML**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-xml): With **IGNORE**, rows that duplicate an existing row on a unique key value are discarded.
* [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update): With **IGNORE**, rows for which duplicate-key conflicts occur on a unique key value are not updated. Rows updated to values that would cause data conversion errors are updated to the closest valid values instead.

The **IGNORE** keyword applies to the following ignorable errors:

[**ER\_BAD\_NULL\_ERROR**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_bad_null_error)

[**ER\_DUP\_ENTRY**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_dup_entry)

[**ER\_DUP\_ENTRY\_WITH\_KEY\_NAME**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_dup_entry_with_key_name)

[**ER\_DUP\_KEY**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_dup_key)

[**ER\_NO\_PARTITION\_FOR\_GIVEN\_VALUE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_no_partition_for_given_value)

[**ER\_NO\_PARTITION\_FOR\_GIVEN\_VALUE\_SILENT**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_no_partition_for_given_value_silent)

[**ER\_NO\_REFERENCED\_ROW\_2**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_no_referenced_row_2)

[**ER\_ROW\_DOES\_NOT\_MATCH\_GIVEN\_PARTITION\_SET**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_row_does_not_match_given_partition_set)

[**ER\_ROW\_IS\_REFERENCED\_2**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_row_is_referenced_2)

[**ER\_SUBQUERY\_NO\_1\_ROW**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_subquery_no_1_row)

[**ER\_VIEW\_CHECK\_FAILED**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_view_check_failed)

##### The Effect of Strict SQL Mode on Statement Execution

The MySQL server can operate in different SQL modes, and can apply these modes differently for different clients, depending on the value of the [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) system variable. In “strict” SQL mode, the server upgrades certain warnings to errors.

For example, in non-strict SQL mode, inserting the string **'abc'** into an integer column results in conversion of the value to 0 and a warning:

mysql> **SET sql\_mode = '';**

Query OK, 0 rows affected (0.00 sec)

mysql> **INSERT INTO t (i) VALUES('abc');**

Query OK, 1 row affected, 1 warning (0.01 sec)

mysql> **SHOW WARNINGS;**

+---------+------+--------------------------------------------------------+

| Level | Code | Message |

+---------+------+--------------------------------------------------------+

| Warning | 1366 | Incorrect integer value: 'abc' for column 'i' at row 1 |

+---------+------+--------------------------------------------------------+

1 row in set (0.00 sec)

In strict SQL mode, the invalid value is rejected with an error:

mysql> **SET sql\_mode = 'STRICT\_ALL\_TABLES';**

Query OK, 0 rows affected (0.00 sec)

mysql> **INSERT INTO t (i) VALUES('abc');**

ERROR 1366 (HY000): Incorrect integer value: 'abc' for column 'i' at row 1

For more information about possible settings of the [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) system variable, see [Section 5.1.11, “Server SQL Modes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sql-mode).

Strict SQL mode applies to the following statements under conditions for which some value might be out of range or an invalid row is inserted into or deleted from a table:

* [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table)
* [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table)
* [**CREATE TABLE ... SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table)
* [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) (both single table and multiple table)
* [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert)
* [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data)
* [**LOAD XML**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-xml)
* [**SELECT SLEEP()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select)
* [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) (both single table and multiple table)

Within stored programs, individual statements of the types just listed execute in strict SQL mode if the program was defined while strict mode was in effect.

Strict SQL mode applies to the following errors, which represent a class of errors in which an input value is either invalid or missing. A value is invalid if it has the wrong data type for the column or might be out of range. A value is missing if a new row to be inserted does not contain a value for a **NOT NULL** column that has no explicit **DEFAULT** clause in its definition.

[**ER\_BAD\_NULL\_ERROR**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_bad_null_error)

[**ER\_CUT\_VALUE\_GROUP\_CONCAT**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_cut_value_group_concat)

[**ER\_DATA\_TOO\_LONG**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_data_too_long)

[**ER\_DATETIME\_FUNCTION\_OVERFLOW**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_datetime_function_overflow)

[**ER\_DIVISION\_BY\_ZERO**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_division_by_zero)

[**ER\_INVALID\_ARGUMENT\_FOR\_LOGARITHM**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_invalid_argument_for_logarithm)

[**ER\_NO\_DEFAULT\_FOR\_FIELD**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_no_default_for_field)

[**ER\_NO\_DEFAULT\_FOR\_VIEW\_FIELD**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_no_default_for_view_field)

[**ER\_TOO\_LONG\_KEY**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_too_long_key)

[**ER\_TRUNCATED\_WRONG\_VALUE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_truncated_wrong_value)

[**ER\_TRUNCATED\_WRONG\_VALUE\_FOR\_FIELD**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_truncated_wrong_value_for_field)

[**ER\_WARN\_DATA\_OUT\_OF\_RANGE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_warn_data_out_of_range)

[**ER\_WARN\_NULL\_TO\_NOTNULL**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_warn_null_to_notnull)

[**ER\_WARN\_TOO\_FEW\_RECORDS**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_warn_too_few_records)

[**ER\_WRONG\_ARGUMENTS**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_wrong_arguments)

[**ER\_WRONG\_VALUE\_FOR\_TYPE**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_wrong_value_for_type)

[**WARN\_DATA\_TRUNCATED**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_warn_data_truncated)

**Note**

Because continued MySQL development defines new errors, there may be errors not in the preceding list to which strict SQL mode applies.

### 5.1.12 连接管理

[5.1.12.1 Connection Interfaces](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces)

[5.1.12.2 Administrative Connection Management](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-connection-interface)

[5.1.12.3 DNS Lookups and the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache)

This section describes how MySQL Server manages connections. This includes a description of the available connection interfaces, how the server uses connection handler threads, details about the administrative connection interface, and management of DNS lookups.

#### 5.1.12.1 Connection Interfaces

This section describes aspects of how the MySQL server manages client connections.

* [Network Interfaces and Connection Manager Threads](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces-interfaces)
* [Client Connection Thread Management](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces-thread-management)
* [Connection Volume Management](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces-volume-management)

##### Network Interfaces and Connection Manager Threads

The server is capable of listening for client connections on multiple network interfaces. Connection manager threads handle client connection requests on the network interfaces that the server listens to:

* On all platforms, one manager thread handles TCP/IP connection requests.
* On Unix, the same manager thread also handles Unix socket file connection requests.
* On Windows, one manager thread handles shared-memory connection requests, and another handles named-pipe connection requests.
* On all platforms, an additional network interface may be enabled to accept administrative TCP/IP connection requests. This interface can use the manager thread that handles “ordinary” TCP/IP requests, or a separate thread.

The server does not create threads to handle interfaces that it does not listen to. For example, a Windows server that does not have support for named-pipe connections enabled does not create a thread to handle them.

Individual server plugins or components may implement their own connection interface:

* X Plugin enables MySQL Server to communicate with clients using X Protocol. See [Section 20.5, “X Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#x-plugin).

##### Client Connection Thread Management

Connection manager threads associate each client connection with a thread dedicated to it that handles authentication and request processing for that connection. Manager threads create a new thread when necessary but try to avoid doing so by consulting the thread cache first to see whether it contains a thread that can be used for the connection. When a connection ends, its thread is returned to the thread cache if the cache is not full.

In this connection thread model, there are as many threads as there are clients currently connected, which has some disadvantages when server workload must scale to handle large numbers of connections. For example, thread creation and disposal becomes expensive. Also, each thread requires server and kernel resources, such as stack space. To accommodate a large number of simultaneous connections, the stack size per thread must be kept small, leading to a situation where it is either too small or the server consumes large amounts of memory. Exhaustion of other resources can occur as well, and scheduling overhead can become significant.

MySQL Enterprise Edition includes a thread pool plugin that provides an alternative thread-handling model designed to reduce overhead and improve performance. It implements a thread pool that increases server performance by efficiently managing statement execution threads for large numbers of client connections. See [Section 5.6.3, “MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool).

To control and monitor how the server manages threads that handle client connections, several system and status variables are relevant. (See [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables), and [Section 5.1.10, “Server Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-status-variables).)

* The [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) system variable determines the thread cache size. By default, the server autosizes the value at startup, but it can be set explicitly to override this default. A value of 0 disables caching, which causes a thread to be set up for each new connection and disposed of when the connection terminates. To enable ***N*** inactive connection threads to be cached, set [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) to ***N*** at server startup or at runtime. A connection thread becomes inactive when the client connection with which it was associated terminates.
* To monitor the number of threads in the cache and how many threads have been created because a thread could not be taken from the cache, check the [**Threads\_cached**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_cached) and [**Threads\_created**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Threads_created) status variables.
* When the thread stack is too small, this limits the complexity of the SQL statements the server can handle, the recursion depth of stored procedures, and other memory-consuming actions. To set a stack size of ***N*** bytes for each thread, start the server with [**thread\_stack**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_stack) set to ***N***.

##### Connection Volume Management

To control the maximum number of clients the server permits to connect simultaneously, set the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) system variable at server startup or at runtime. It may be necessary to increase [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) if more clients attempt to connect simultaneously then the server is configured to handle (see [Section B.3.2.5, “Too many connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#too-many-connections)). If the server refuses a connection because the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) limit is reached, it increments the [**Connection\_errors\_max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_max_connections) status variable.

[**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) actually permits [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) + 1 client connections. The extra connection is reserved for use by accounts that have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege). By granting the privilege to administrators and not to normal users (who should not need it), an administrator can connect to the server and use [**SHOW PROCESSLIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-processlist) to diagnose problems even if the maximum number of unprivileged clients are connected. See [Section 13.7.7.29, “SHOW PROCESSLIST Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-processlist).

As of MySQL 8.0.14, the server also permits administrative connections on an administrative network interface, which you can set up using a dedicated IP address and port. See [Section 5.1.12.2, “Administrative Connection Management”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-connection-interface).

The Group Replication plugin interacts with MySQL Server using internal sessions to perform SQL API operations. In releases to MySQL 8.0.18, these sessions count towards the client connections limit specified by the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) server system variable. In those releases, if the server has reached the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) limit when Group Replication is started or attempts to perform an operation, the operation is unsuccessful and Group Replication or the server itself might stop. From MySQL 8.0.19, Group Replication's internal sessions are handled separately from client connections, so they do not count towards the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) limit and are not refused if the server has reached this limit.

The maximum number of client connections MySQL supports (that is, the maximum value to which [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) can be set) depends on several factors:

* The quality of the thread library on a given platform.
* The amount of RAM available.
* The amount of RAM is used for each connection.
* The workload from each connection.
* The desired response time.
* The number of file descriptors available.

Linux or Solaris should be able to support at least 500 to 1000 simultaneous connections routinely and as many as 10,000 connections if you have many gigabytes of RAM available and the workload from each is low or the response time target undemanding.

Increasing the [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) value increases the number of file descriptors that [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) requires. If the required number of descriptors are not available, the server reduces the value of [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections). For comments on file descriptor limits, see [Section 8.4.3.1, “How MySQL Opens and Closes Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#table-cache).

Increasing the [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) system variable may be necessary, which may also require raising the operating system limit on how many file descriptors can be used by MySQL. Consult your operating system documentation to determine whether it is possible to increase the limit and how to do so. See also [Section B.3.2.16, “File Not Found and Similar Errors”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#not-enough-file-handles).

#### 5.1.12.2 Administrative Connection Management

As mentioned in [Connection Volume Management](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#connection-interfaces-volume-management), to allow for the need to perform administrative operations even when [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) connections are already established on the interfaces used for ordinary connections, the MySQL server permits a single administrative connection to users who have the [**CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_connection-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege).

Additionally, as of MySQL 8.0.14, the server permits dedicating a TCP/IP port for administrative connections, as described in the following sections.

* [Administrative Interface Characteristics](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-characteristics)
* [Administrative Interface Support for Encrypted Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#administrative-interface-encrypted-connections)

##### Administrative Interface Characteristics

The administrative connection interface has these characteristics:

* The server enables the interface only if the [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) system variable is set at startup to indicate the IP address for it. If [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address) is not set, the server maintains no administrative interface.
* The [**admin\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_port) system variable specifies the interface TCP/IP port number (default 33062).
* There is no limit on the number of administrative connections, but connections are permitted only for users who have the [**SERVICE\_CONNECTION\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_service-connection-admin) privilege.
* The [**create\_admin\_listener\_thread**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_create_admin_listener_thread) system variable enables DBAs to choose at startup whether the administrative interface has its own separate thread. The default is **OFF**; that is, the manager thread for ordinary connections on the main interface also handles connections for the administrative interface.

These lines in the server my.cnf file enable the administrative interface on the loopback interface and configure it to use port number 33064 (that is, a port different from the default):

[mysqld]

admin\_address=127.0.0.1

admin\_port=33064

MySQL client programs connect to either the main or administrative interface by specifying appropriate connection parameters. If the server running on the local host is using the default TCP/IP port numbers of 3306 and 33062 for the main and administrative interfaces, these commands connect to those interfaces:

mysql --protocol=TCP --port=3306

mysql --protocol=TCP --port=33062

##### Administrative Interface Support for Encrypted Connections

Prior to MySQL 8.0.21, the administrative interface supports encrypted connections using the connection-encryption configuration that applies to the main interface. As of MySQL 8.0.21, the administrative interface has its own configuration parameters for encrypted connections. These correspond to the main interface parameters but enable independent configuration of encrypted connections for the administrative interface:

* The **admin\_tls\_*xxx*** and **admin\_ssl\_*xxx*** system variables are like the **tls\_*xxx*** and **ssl\_*xxx*** system variables, but they configure the TLS context for the administrative interface rather than the main interface.
* The [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) option is like the [--ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ssl) option, but it enables or disables support for encrypted connections on the administrative interface rather than the main interface.

Because support for encrypted connections is enabled by default, it is normally unnecessary to specify [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl). As of MySQL 8.0.26, [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) is deprecated and subject to removal in a future MySQL version.

For general information about configuring connection-encryption support, see [Section 6.3.1, “Configuring MySQL to Use Encrypted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections), and [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#encrypted-connection-protocols-ciphers). That discussion is written for the main connection interface, but the parameter names are similar for the administrative connection interface. Use that discussion together with the following remarks, which provide information specific to the administrative interface.

TLS configuration for the administrative interface follows these rules:

* If [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) is enabled (the default), the administrative interface supports encrypted connections. For connections on the interface, the applicable TLS context depends on whether any nondefault administrative TLS parameter is configured:
  + If all administrative TLS parameters have their default values, the administrative interface uses the same TLS context as the main interface.
  + If any administrative TLS parameter has a nondefault value, the administrative interface uses the TLS context defined by its own parameters. (This is the case if any **admin\_tls\_*xxx*** or **admin\_ssl\_*xxx*** system variable is set to a value different from its default.) If a valid TLS context cannot be created from those parameters, the administrative interface falls back to the main interface TLS context.
* If [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) is disabled (for example, by specifying [--admin-ssl=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl), encrypted connections to the administrative interface are disabled. This is true even if administrative TLS parameters have nondefault values because disabling [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) takes precedence.

It is also possible to disable encrypted connections on the administrative interface without specifying [--admin-ssl](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_admin-ssl) in negated form. Set the [**admin\_tls\_version**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_tls_version) system variable to the empty value to indicate that no TLS versions are supported. For example, these lines in the server my.cnf file disable encrypted connections on the administrative interface:

[mysqld]

admin\_tls\_version=''

Examples:

* This configuration in the server my.cnf file enables the administrative interface, but does not set any of the TLS parameters specific to that interface:
* [mysqld]
* admin\_address=127.0.0.1

As a result, the administrative interface supports encrypted connections (because encryption is supported by default when the administrative interface is enabled), and uses the main interface TLS context. When clients connect to the administrative interface, they should use the same certificate and key files as for ordinary connections on the main interface. For example (enter the command on a single line):

mysql --protocol=TCP --port=33062

--ssl-ca=ca.pem

--ssl-cert=client-cert.pem

--ssl-key=client-key.pem

* This server configuration enables the administrative interface and sets the TLS certificate and key file parameters specific to that interface:
* [mysqld]
* admin\_address=127.0.0.1
* admin\_ssl\_ca=admin-ca.pem
* admin\_ssl\_cert=admin-server-cert.pem
* admin\_ssl\_key=admin-server-key.pem

As a result, the administrative interface supports encrypted connections using its own TLS context. When clients connect to the administrative interface, they should use certificate and key files specific to that interface. For example (enter the command on a single line):

mysql --protocol=TCP --port=33062

--ssl-ca=admin-ca.pem

--ssl-cert=admin-client-cert.pem

--ssl-key=admin-client-key.pem

#### 5.1.12.3 DNS Lookups and the Host Cache

The MySQL server maintains an in-memory host cache that contains information about clients: IP address, host name, and error information. The Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table exposes the contents of the host cache so that it can be examined using [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements. This may help you diagnose the causes of connection problems. See [Section 27.12.21.2, “The host\_cache Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table).

The following sections discuss how the host cache works, as well as other topics such as how to configure and monitor the cache.

* [Host Cache Operation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-operation)
* [Configuring the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-configuration)
* [Monitoring the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-monitoring)
* [Flushing the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-flushing)
* [Dealing with Blocked Hosts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#blocked-host)

##### Host Cache Operation

The server uses the host cache only for non-localhost TCP connections. It does not use the cache for TCP connections established using a loopback interface address (for example, **127.0.0.1** or **::1**), or for connections established using a Unix socket file, named pipe, or shared memory.

The server uses the host cache for several purposes:

* By caching the results of IP-to-host name lookups, the server avoids doing a Domain Name System (DNS) lookup for each client connection. Instead, for a given host, it needs to perform a lookup only for the first connection from that host.
* The cache contains information about errors that occur during the client connection process. Some errors are considered “blocking.” If too many of these occur successively from a given host without a successful connection, the server blocks further connections from that host. The [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) system variable determines the permitted number of successive errors before blocking occurs.

For each applicable new client connection, the server uses the client IP address to check whether the client host name is in the host cache. If so, the server refuses or continues to process the connection request depending on whether or not the host is blocked. If the host is not in the cache, the server attempts to resolve the host name. First, it resolves the IP address to a host name and resolves that host name back to an IP address. Then it compares the result to the original IP address to ensure that they are the same. The server stores information about the result of this operation in the host cache. If the cache is full, the least recently used entry is discarded.

The server performs host name resolution using the gethostbyaddr() and gethostbyname() system calls.

The server handles entries in the host cache like this:

1. When the first TCP client connection reaches the server from a given IP address, a new cache entry is created to record the client IP, host name, and client lookup validation flag. Initially, the host name is set to **NULL** and the flag is false. This entry is also used for subsequent client TCP connections from the same originating IP.
2. If the validation flag for the client IP entry is false, the server attempts an IP-to-host name-to-IP DNS resolution. If that is successful, the host name is updated with the resolved host name and the validation flag is set to true. If resolution is unsuccessful, the action taken depends on whether the error is permanent or transient. For permanent failures, the host name remains **NULL** and the validation flag is set to true. For transient failures, the host name and validation flag remain unchanged. (In this case, another DNS resolution attempt occurs the next time a client connects from this IP.)
3. If an error occurs while processing an incoming client connection from a given IP address, the server updates the corresponding error counters in the entry for that IP. For a description of the errors recorded, see [Section 27.12.21.2, “The host\_cache Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table).

To unblock blocked hosts, flush the host cache; see [Dealing with Blocked Hosts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#blocked-host).

It is possible for a blocked host to become unblocked even without flushing the host cache if activity from other hosts occurs:

* If the cache is full when a connection arrives from a client IP not in the cache, the server discards the least recently used cache entry to make room for the new entry.
* If the discarded entry is for a blocked host, that host becomes unblocked.

Some connection errors are not associated with TCP connections, occur very early in the connection process (even before an IP address is known), or are not specific to any particular IP address (such as out-of-memory conditions). For information about these errors, check the [**Connection\_errors\_*xxx***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Connection_errors_xxx) status variables (see [Section 5.1.10, “Server Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-status-variables)).

##### Configuring the Host Cache

The host cache is enabled by default. The [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) system variable controls its size, as well as the size of the Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table that exposes the cache contents. The cache size can be set at server startup and changed at runtime. For example, to set the size to 100 at startup, put these lines in the server my.cnf file:

[mysqld]

host\_cache\_size=200

To change the size to 300 at runtime, do this:

SET GLOBAL host\_cache\_size=300;

Setting **host\_cache\_size** to 0, either at server startup or at runtime, disables the host cache. With the cache disabled, the server performs a DNS lookup every time a client connects.

Changing the cache size at runtime causes an implicit host cache flushing operation that clears the host cache, truncates the [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table, and unblocks any blocked hosts; see [Flushing the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-flushing).

Using the [--skip-host-cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) option is similar to setting the [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) system variable to 0, but [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) is more flexible because it can also be used to resize, enable, and disable the host cache at runtime, not just at server startup. Starting the server with [--skip-host-cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-host-cache) does not prevent runtime changes to the value of [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size), but such changes have no effect and the cache is not re-enabled even if [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) is set larger than 0.

To disable DNS host name lookups, start the server with the [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) system variable enabled. In this case, the server uses only IP addresses and not host names to match connecting hosts to rows in the MySQL grant tables. Only accounts specified in those tables using IP addresses can be used. (A client may not be able to connect if no account exists that specifies the client IP address.)

If you have a very slow DNS and many hosts, you might be able to improve performance either by enabling [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) to disable DNS lookups, or by increasing the value of [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) to make the host cache larger.

To disallow TCP/IP connections entirely, start the server with the [**skip\_networking**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_networking) system variable enabled.

To adjust the permitted number of successive connection errors before host blocking occurs, set the [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) system variable. For example, to set the value at startup put these lines in the server my.cnf file:

[mysqld]

max\_connect\_errors=10000

To change the value at runtime, do this:

SET GLOBAL max\_connect\_errors=10000;

##### Monitoring the Host Cache

The Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table exposes the contents of the host cache. This table can be examined using [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements, which may help you diagnose the causes of connection problems. For information about this table, see [Section 27.12.21.2, “The host\_cache Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table).

##### Flushing the Host Cache

Flushing the host cache might be advisable or desirable under these conditions:

* Some of your client hosts change IP address.
* The error message **Host '*host\_name*' is blocked** occurs for connections from legitimate hosts. (See [Dealing with Blocked Hosts](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#blocked-host).)

Flushing the host cache has these effects:

* It clears the in-memory host cache.
* It removes all rows from the Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table that exposes the cache contents.
* It unblocks any blocked hosts. This enables further connection attempts from those hosts.

To flush the host cache, use any of these methods:

* Change the value of the [**host\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_host_cache_size) system variable. This requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege).
* Execute a [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table) statement that truncates the Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table. This requires the [**DROP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_drop) privilege for the table.
* Execute a [**FLUSH HOSTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-hosts) statement. This requires the [**RELOAD**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_reload) privilege.
* Execute a [**mysqladmin flush-hosts**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) command. This requires the [**DROP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_drop) privilege for the Performance Schema [**host\_cache**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-host-cache-table) table or the [**RELOAD**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_reload) privilege.

##### Dealing with Blocked Hosts

The server uses the host cache to track errors that occur during the client connection process. If the following error occurs, it means that [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) has received many connection requests from the given host that were interrupted in the middle:

Host '***host\_name***' is blocked because of many connection errors.

Unblock with 'mysqladmin flush-hosts'

The value of the [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) system variable determines how many successive interrupted connection requests the server permits before blocking a host. After [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) failed requests without a successful connection, the server assumes that something is wrong (for example, that someone is trying to break in), and blocks the host from further connection requests.

To unblock blocked hosts, flush the host cache; see [Flushing the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-flushing).

Alternatively, to avoid having the error message occur, set [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) as described in [Configuring the Host Cache](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#host-cache-configuration). The default value of [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) is 100. Increasing [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) to a large value makes it less likely that a host reaches the threshold and becomes blocked. However, if the **Host '*host\_name*' is blocked** error message occurs, first verify that there is nothing wrong with TCP/IP connections from the blocked hosts. It does no good to increase the value of [**max\_connect\_errors**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connect_errors) if there are network problems.

### 5.1.13 IPv6 支持

[5.1.13.1 Verifying System Support for IPv6](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-system-support)

[5.1.13.2 Configuring the MySQL Server to Permit IPv6 Connections](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-server-config)

[5.1.13.3 Connecting Using the IPv6 Local Host Address](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-local-connections)

[5.1.13.4 Connecting Using IPv6 Nonlocal Host Addresses](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-remote-connections)

[5.1.13.5 Obtaining an IPv6 Address from a Broker](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-brokers)

Support for IPv6 in MySQL includes these capabilities:

* MySQL Server can accept TCP/IP connections from clients connecting over IPv6. For example, this command connects over IPv6 to the MySQL server on the local host:
* shell> **mysql -h ::1**

To use this capability, two things must be true:

* + Your system must be configured to support IPv6. See [Section 5.1.13.1, “Verifying System Support for IPv6”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-system-support).
  + The default MySQL server configuration permits IPv6 connections in addition to IPv4 connections. To change the default configuration, start the server with the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) system variable set to an appropriate value. See [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).
* MySQL account names permit IPv6 addresses to enable DBAs to specify privileges for clients that connect to the server over IPv6. See [Section 6.2.4, “Specifying Account Names”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#account-names). IPv6 addresses can be specified in account names in statements such as [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user), [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant), and [**REVOKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#revoke). For example:
* mysql> **CREATE USER 'bill'@'::1' IDENTIFIED BY 'secret';**
* mysql> **GRANT SELECT ON mydb.\* TO 'bill'@'::1';**
* IPv6 functions enable conversion between string and internal format IPv6 address formats, and checking whether values represent valid IPv6 addresses. For example, [**INET6\_ATON()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_inet6-aton) and [**INET6\_NTOA()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_inet6-ntoa) are similar to [**INET\_ATON()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_inet-aton) and [**INET\_NTOA()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_inet-ntoa), but handle IPv6 addresses in addition to IPv4 addresses. See [Section 12.24, “Miscellaneous Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#miscellaneous-functions).
* From MySQL 8.0.14, Group Replication group members can use IPv6 addresses for communications within the group. A group can contain a mix of members using IPv6 and members using IPv4. See [Section 18.5.5, “Support For IPv6 And For Mixed IPv6 And IPv4 Groups”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#group-replication-ipv6).

The following sections describe how to set up MySQL so that clients can connect to the server over IPv6.

#### 5.1.13.1 Verifying System Support for IPv6

Before MySQL Server can accept IPv6 connections, the operating system on your server host must support IPv6. As a simple test to determine whether that is true, try this command:

shell> **ping6 ::1**

16 bytes from ::1, icmp\_seq=0 hlim=64 time=0.171 ms

16 bytes from ::1, icmp\_seq=1 hlim=64 time=0.077 ms

...

To produce a description of your system's network interfaces, invoke **ifconfig -a** and look for IPv6 addresses in the output.

If your host does not support IPv6, consult your system documentation for instructions on enabling it. It might be that you need only reconfigure an existing network interface to add an IPv6 address. Or a more extensive change might be needed, such as rebuilding the kernel with IPv6 options enabled.

These links may be helpful in setting up IPv6 on various platforms:

* [Windows](https://msdn.microsoft.com/en-us/library/dd163569.aspx)
* [Gentoo Linux](http://www.gentoo.org/doc/en/ipv6.xml)
* [Ubuntu Linux](https://wiki.ubuntu.com/IPv6)
* [Linux (Generic)](http://www.tldp.org/HOWTO/Linux+IPv6-HOWTO/)
* [macOS](https://support.apple.com/en-us/HT202237)

#### 5.1.13.2 Configuring the MySQL Server to Permit IPv6 Connections

The MySQL server listens on one or more network sockets for TCP/IP connections. Each socket is bound to one address, but it is possible for an address to map onto multiple network interfaces.

Set the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) system variable at server startup to specify the TCP/IP connections that a server instance accepts. As of MySQL 8.0.13, you can specify multiple values for this option, including any combination of IPv6 addresses, IPv4 addresses, and host names that resolve to IPv6 or IPv4 addresses. Alternatively, you can specify one of the wildcard address formats that permit listening on multiple network interfaces. A value of \*, which is the default, or a value of **::**, permit both IPv4 and IPv6 connections on all server host IPv4 and IPv6 interfaces. For more information, see the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) description in [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

#### 5.1.13.3 Connecting Using the IPv6 Local Host Address

The following procedure shows how to configure MySQL to permit IPv6 connections by clients that connect to the local server using the **::1** local host address. The instructions given here assume that your system supports IPv6.

1. Start the MySQL server with an appropriate [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) setting to permit it to accept IPv6 connections. For example, put the following lines in the server option file and restart the server:
2. [mysqld]
3. bind\_address = \*

Specifying \* (or **::**) as the value for [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) permits both IPv4 and IPv6 connections on all server host IPv4 and IPv6 interfaces. If you want to bind the server to a specific list of addresses, you can do this as of MySQL 8.0.13 by specifying a comma-separated list of values for [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address). This example specifies the local host addresses for both IPv4 and IPv6:

[mysqld]

bind\_address = 127.0.0.1,::1

For more information, see the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) description in [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

1. As an administrator, connect to the server and create an account for a local user who can connect from the **::1** local IPv6 host address:
2. mysql> **CREATE USER 'ipv6user'@'::1' IDENTIFIED BY 'ipv6pass';**

For the permitted syntax of IPv6 addresses in account names, see [Section 6.2.4, “Specifying Account Names”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#account-names). In addition to the [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) statement, you can issue [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant) statements that give specific privileges to the account, although that is not necessary for the remaining steps in this procedure.

1. Invoke the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) client to connect to the server using the new account:
2. shell> **mysql -h ::1 -u ipv6user -pipv6pass**
3. Try some simple statements that show connection information:
4. mysql> **STATUS**
5. ...
6. Connection: ::1 via TCP/IP
7. ...
8. mysql> **SELECT CURRENT\_USER(), @@bind\_address;**
9. +----------------+----------------+
10. | CURRENT\_USER() | @@bind\_address |
11. +----------------+----------------+
12. | ipv6user@::1 | :: |
13. +----------------+----------------+

#### 5.1.13.4 Connecting Using IPv6 Nonlocal Host Addresses

The following procedure shows how to configure MySQL to permit IPv6 connections by remote clients. It is similar to the preceding procedure for local clients, but the server and client hosts are distinct and each has its own nonlocal IPv6 address. The example uses these addresses:

Server host: 2001:db8:0:f101::1

Client host: 2001:db8:0:f101::2

These addresses are chosen from the nonroutable address range recommended by [IANA](http://www.iana.org/assignments/ipv6-unicast-address-assignments/ipv6-unicast-address-assignments.xml) for documentation purposes and suffice for testing on your local network. To accept IPv6 connections from clients outside the local network, the server host must have a public address. If your network provider assigns you an IPv6 address, you can use that. Otherwise, another way to obtain an address is to use an IPv6 broker; see [Section 5.1.13.5, “Obtaining an IPv6 Address from a Broker”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ipv6-brokers).

1. Start the MySQL server with an appropriate [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) setting to permit it to accept IPv6 connections. For example, put the following lines in the server option file and restart the server:
2. [mysqld]
3. bind\_address = \*

Specifying \* (or **::**) as the value for [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) permits both IPv4 and IPv6 connections on all server host IPv4 and IPv6 interfaces. If you want to bind the server to a specific list of addresses, you can do this as of MySQL 8.0.13 by specifying a comma-separated list of values for [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address). This example specifies an IPv4 address as well as the required server host IPv6 address:

[mysqld]

bind\_address = 198.51.100.20,2001:db8:0:f101::1

For more information, see the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) description in [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

1. On the server host (**2001:db8:0:f101::1**), create an account for a user who can connect from the client host (**2001:db8:0:f101::2**):
2. mysql> **CREATE USER 'remoteipv6user'@'2001:db8:0:f101::2' IDENTIFIED BY 'remoteipv6pass';**
3. On the client host (**2001:db8:0:f101::2**), invoke the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) client to connect to the server using the new account:
4. shell> **mysql -h 2001:db8:0:f101::1 -u remoteipv6user -premoteipv6pass**
5. Try some simple statements that show connection information:
6. mysql> **STATUS**
7. ...
8. Connection: 2001:db8:0:f101::1 via TCP/IP
9. ...
10. mysql> **SELECT CURRENT\_USER(), @@bind\_address;**
11. +-----------------------------------+----------------+
12. | CURRENT\_USER() | @@bind\_address |
13. +-----------------------------------+----------------+
14. | remoteipv6user@2001:db8:0:f101::2 | :: |
15. +-----------------------------------+----------------+

#### 5.1.13.5 Obtaining an IPv6 Address from a Broker

If you do not have a public IPv6 address that enables your system to communicate over IPv6 outside your local network, you can obtain one from an IPv6 broker. The [Wikipedia IPv6 Tunnel Broker page](http://en.wikipedia.org/wiki/List_of_IPv6_tunnel_brokers) lists several brokers and their features, such as whether they provide static addresses and the supported routing protocols.

After configuring your server host to use a broker-supplied IPv6 address, start the MySQL server with an appropriate [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) setting to permit the server to accept IPv6 connections. You can specify \* (or **::**) as the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) value, or bind the server to the specific IPv6 address provided by the broker. For more information, see the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) description in [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables).

Note that if the broker allocates dynamic addresses, the address provided for your system might change the next time you connect to the broker. If so, any accounts you create that name the original address become invalid. To bind to a specific address but avoid this change-of-address problem, you might be able to arrange with the broker for a static IPv6 address.

The following example shows how to use Freenet6 as the broker and the **gogoc** IPv6 client package on Gentoo Linux.

1. Create an account at Freenet6 by visiting this URL and signing up:
2. <http://gogonet.gogo6.com>
3. After creating the account, go to this URL, sign in, and create a user ID and password for the IPv6 broker:
4. <http://gogonet.gogo6.com/page/freenet6-registration>
5. As **root**, install **gogoc**:
6. shell> **emerge gogoc**
7. Edit /etc/gogoc/gogoc.conf to set the **userid** and **password** values. For example:
8. userid=gogouser
9. passwd=gogopass
10. Start **gogoc**:
11. shell> **/etc/init.d/gogoc start**

To start **gogoc** each time your system boots, execute this command:

shell> **rc-update add gogoc default**

1. Use **ping6** to try to ping a host:
2. shell> **ping6 ipv6.google.com**
3. To see your IPv6 address:
4. shell> **ifconfig tun**

### 5.1.14 网络命名空间支持

A network namespace is a logical copy of the network stack from the host system. Network namespaces are useful for setting up containers or virtual environments. Each namespace has its own IP addresses, network interfaces, routing tables, and so forth. The default or global namespace is the one in which the host system physical interfaces exist.

Namespace-specific address spaces can lead to problems when MySQL connections cross namespaces. For example, the network address space for a MySQL instance running in a container or virtual network may differ from the address space of the host machine. This can produce phenomena such as a client connection from an address in one namespace appearing to the MySQL server to be coming from a different address, even for client and server running on the same machine. Suppose that both processes run on a host with IP address **203.0.113.10** but use different namespaces. A connection may produce a result like this:

shell> **mysql --user=admin --host=203.0.113.10 --protocol=tcp**

mysql> **SELECT USER();**

+--------------------+

| USER() |

+--------------------+

| admin@198.51.100.2 |

+--------------------+

In this case, the expected [**USER()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_user) value is **admin@203.0.113.10**. Such behavior can make it difficult to assign account permissions properly if the address from which an connection originates is not what it appears.

To address this issue, MySQL enables specifying the network namespace to use for TCP/IP connections, so that both endpoints of connections use an agreed-upon common address space.

MySQL 8.0.22 and higher supports network namespaces on platforms that implement them. Support within MySQL applies to:

* The MySQL server, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).
* X Plugin.
* The [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) client and the **mysqlxtest** test suite client. (Other clients are not supported. They must be invoked from within the network namespace of the server to which they are to connect.)
* Regular replication. (Group Replication is not supported.)

The following sections describe how to use network namespaces in MySQL:

* [Host System Prerequisites](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#network-namespaces-host-prerequisites)
* [MySQL Configuration](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#network-namespaces-mysql-configuration)
* [Network Namespace Monitoring](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#network-namespaces-monitoring)

#### Host System Prerequisites

Prior to using network namespace support in MySQL, these host system prerequisites must be satisifed:

* The host operating system must support network namespaces. (For example, Linux.)
* Any network namespace to be used by MySQL must first be created on the host system.
* Host name resolution must be configured by the system administrator to support network namespaces.

**Note**

A known limitation is that, within MySQL, host name resolution does not work for names specified in network namespace-specific host files. For example, if the address for a host name in the **red** namespace is specified in the /etc/netns/red/hosts file, binding to the name fails on both the server and client sides. The workaround is to use the IP address rather than the host name.

* The system administrator must enable the **CAP\_SYS\_ADMIN** operating system privilege for the MySQL binaries that support network namespaces ([**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql), **mysqlxtest**).

**Important**

Enabling **CAP\_SYS\_ADMIN** is a security sensitive operation because it enables a process to perform other privileged actions in addition to setting namespaces. For a description of its effects, see <https://man7.org/linux/man-pages/man7/capabilities.7.html>.

Because **CAP\_SYS\_ADMIN** must be enabled explicitly by the system administrator, MySQL binaries by default do not have network namespace support enabled. The system administrator should evaluate the security implications of running MySQL processes with **CAP\_SYS\_ADMIN** before enabling it.

The instructions in the following example set up network namespaces named **red** and **blue**. The names you choose may differ, as may the network addresses and interfaces on your host system.

Invoke the commands shown here either as the **root** operating system user or by prefixing each command with **sudo**. For example, to invoke the **ip** or **setcap** command if you are not **root**, use **sudo ip** or **sudo setcap**.

To configure network namespaces, use the **ip** command. For some operations, the **ip** command must execute within a particular namespace (which must already exist). In such cases, begin the command like this:

ip netns exec ***namespace\_name***

For example, this command executes within the **red** namespace to bring up the loopback interface:

ip netns exec red ip link set lo up

To add namespaces named **red** and **blue**, each with its own virtual Ethernet device used as a link between namespaces and its own loopback interface:

ip netns add red

ip link add veth-red type veth peer name vpeer-red

ip link set vpeer-red netns red

ip addr add 192.0.2.1/24 dev veth-red

ip link set veth-red up

ip netns exec red ip addr add 192.0.2.2/24 dev vpeer-red

ip netns exec red ip link set vpeer-red up

ip netns exec red ip link set lo up

ip netns add blue

ip link add veth-blue type veth peer name vpeer-blue

ip link set vpeer-blue netns blue

ip addr add 198.51.100.1/24 dev veth-blue

ip link set veth-blue up

ip netns exec blue ip addr add 198.51.100.2/24 dev vpeer-blue

ip netns exec blue ip link set vpeer-blue up

ip netns exec blue ip link set lo up

# if you want to enable inter-subnet routing...

sysctl net.ipv4.ip\_forward=1

ip netns exec red ip route add default via 192.0.2.1

ip netns exec blue ip route add default via 198.51.100.1

A diagram of the links between namespaces looks like this:

red global blue

192.0.2.2 <=> 192.0.2.1

(vpeer-red) (veth-red)

198.51.100.1 <=> 198.51.100.2

(veth-blue) (vpeer-blue)

To check which namespaces and links exist:

ip netns list

ip link list

To see the routing tables for the global and named namespaces:

ip route show

ip netns exec red ip route show

ip netns exec blue ip route show

To remove the **red** and **blue** links and namespaces:

ip link del veth-red

ip link del veth-blue

ip netns del red

ip netns del blue

sysctl net.ipv4.ip\_forward=0

So that the MySQL binaries that include network namespace support can actually use namespaces, you must grant them the **CAP\_SYS\_ADMIN** capability. The following **setcap** commands assume that you have changed location to the directory containing your MySQL binaries (adjust the pathname for your system as necessary):

cd /usr/local/mysql/bin

To grant **CAP\_SYS\_ADMIN** capability to the appropriate binaries:

setcap cap\_sys\_admin+ep ./mysqld

setcap cap\_sys\_admin+ep ./mysql

setcap cap\_sys\_admin+ep ./mysqlxtest

To check **CAP\_SYS\_ADMIN** capability:

shell> **getcap ./mysqld ./mysql ./mysqlxtest**

./mysqld = cap\_sys\_admin+ep

./mysql = cap\_sys\_admin+ep

./mysqlxtest = cap\_sys\_admin+ep

To remove **CAP\_SYS\_ADMIN** capability:

setcap -r ./mysqld

setcap -r ./mysql

setcap -r ./mysqlxtest

**Important**

If you reinstall binaries to which you have previously applied **setcap**, you must use **setcap** again. For example, if you perform an in-place MySQL upgrade, failure to grant the **CAP\_SYS\_ADMIN** capability again results in namespace-related failures. The server fails with this error for attempts to bind to an address with a named namespace:

[ERROR] [MY-013408] [Server] setns() failed with error 'Operation not permitted'

A client invoked with the [--network-namespace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysql_network-namespace) option fails like this:

ERROR: Network namespace error: Operation not permitted

#### MySQL Configuration

Assuming that the preceding host system prerequisites have been satisfied, MySQL enables configuring the server-side namespace for the listening (inbound) side of connections and the client-side namespace for the outbound side of connections.

On the server side, the [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address), [**admin\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_admin_address), and [**mysqlx\_bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_bind_address) system variables have extended syntax for specifying the network namespace to use for a given IP address or host name on which to listen for incoming connections. To specify a namespace for an address, add a slash and the namespace name. For example, a server my.cnf file might contain these lines:

[mysqld]

bind\_address = 127.0.1.1,192.0.2.2/red,198.51.100.2/blue

admin\_address = 102.0.2.2/red

mysqlx\_bind\_address = 102.0.2.2/red

These rules apply:

* A network namespace can be specified for an IP address or a host name.
* A network namespace cannot be specified for a wildcard IP address.
* For a given address, the network namespace is optional. If given, it must be specified as a **/*ns*** suffix immediately following the address.
* An address with no **/*ns*** suffix uses the host system global namespace. The global namespace is therefore the default.
* An address with a **/*ns*** suffix uses the namespace named ***ns***.
* The host system must support network namespaces and each named namespace must previously have been set up. Naming a nonexistent namespace produces an error.
* [**bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_bind_address) and (as of MySQL 8.0.21) [**mysqlx\_bind\_address**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_bind_address) accept a list of multiple comma-separated addresses, the variable value can specify addresses in the global namespace, in named namespaces, or a mix.

If an error occurs during server startup for attempts to use a namespace, the server does not start. If errors occur for X Plugin during plugin initialization such that it is unable to bind to any address, the plugin fails its initialization sequence and the server does not load it.

On the client side, a network namespace can be specified in these contexts:

* For the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) client and the **mysqlxtest** test suite client, use the [--network-namespace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysql_network-namespace) option. For example:
* mysql --host=192.0.2.2 --network-namespace=red

If the [--network-namespace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysql_network-namespace) option is omitted, the connection uses the default (global) namespace.

* For replication connections from replica servers to source servers, use the [**CHANGE REPLICATION SOURCE TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-replication-source-to) statement (from MySQL 8.0.23) or [**CHANGE MASTER TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-master-to) statement (before MySQL 8.0.23) and specify the **NETWORK\_NAMESPACE** option. For example:
* CHANGE REPLICATION SOURCE TO
* SOURCE\_HOST = '192.0.2.2',
* NETWORK\_NAMESPACE = 'red';

If the **NETWORK\_NAMESPACE** option is omitted, replication connections use the default (global) namespace.

The following example sets up a MySQL server that listens for connections in the global, **red**, and **blue** namespaces, and shows how to configure accounts that connect from the **red** and **blue** namespaces. It is assumed that the **red** and **blue** namespaces have already been created as shown in [Host System Prerequisites](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#network-namespaces-host-prerequisites).

1. Configure the server to listen on addresses in multiple namespaces. Put these lines in the server my.cnf file and start the server:
2. [mysqld]
3. bind\_address = 127.0.1.1,192.0.2.2/red,198.51.100.2/blue

The value tells the server to listen on the loopback address **127.0.0.1** in the global namespace, the address **192.0.2.2** in the **red** namespace, and the address **198.51.100.2** in the **blue** namespace.

1. Connect to the server in the global namespace and create accounts that have permission to connect from an address in the address space of each named namespace:
2. shell> **mysql -u root -h 127.0.0.1 -p**
3. Enter password: ***root\_password***
4. mysql> **CREATE USER 'red\_user'@'192.0.2.2'**
5. **IDENTIFIED BY '*red\_user\_password*';**
6. mysql> **CREATE USER 'blue\_user'@'198.51.100.2'**
7. **IDENTIFIED BY '*blue\_user\_password*';**
8. Verify that you can connect to the server in each named namespace:
9. shell> **mysql -u red\_user -h 192.0.2.2 --network-namespace=red -p**
10. Enter password: ***red\_user\_password***
11. mysql> **SELECT USER();**
12. +--------------------+
13. | USER() |
14. +--------------------+
15. | red\_user@192.0.2.2 |
16. +--------------------+
17. shell> **mysql -u blue\_user -h 198.51.100.2 --network-namespace=blue -p**
18. Enter password: ***blue\_user\_password***
19. mysql> **SELECT USER();**
20. +------------------------+
21. | USER() |
22. +------------------------+
23. | blue\_user@198.51.100.2 |
24. +------------------------+

**Note**

You might see different results from [**USER()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_user), which can return a value that includes a host name rather than an IP address if your DNS is configured to be able to resolve the address to the corresponding host name and the server is not run with the [**skip\_name\_resolve**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_skip_name_resolve) system variable enabled.

You might also try invoking [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) without the [--network-namespace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysql_network-namespace) option to see whether the connection attempt succeeds, and, if so, how the [**USER()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_user) value is affected.

#### Network Namespace Monitoring

For replication monitoring purposes, these information sources have a column that displays the applicable network namespace for connections:

* The Performance Schema **replication\_connection\_configuration** table. See [Section 27.12.11.1, “The replication\_connection\_configuration Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-replication-connection-configuration-table).
* The replica server connection metadata repository. See [Section 17.2.4.2, “Replication Metadata Repositories”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replica-logs-status).
* The [**SHOW REPLICA | SLAVE STATUS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-replica-status) statement. See [Section 13.7.7.35, “SHOW REPLICA | SLAVE STATUS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-replica-status).

### 5.1.15 mysql服务端时区支持

This section describes the time zone settings maintained by MySQL, how to load the system tables required for named time support, how to stay current with time zone changes, and how to enable leap-second support.

Beginning with MySQL 8.0.19, time zone offsets are also supported for inserted datetime values; see [Section 11.2.2, “The DATE, DATETIME, and TIMESTAMP Types”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime), for more information.

* [Time Zone Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-variables)
* [Populating the Time Zone Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-installation)
* [Staying Current with Time Zone Changes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-upgrades)
* [Time Zone Leap Second Support](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-leap-seconds)

For information about time zone settings in replication setups, see [Section 17.5.1.14, “Replication and System Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-functions) and [Section 17.5.1.33, “Replication and Time Zones”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-timezone).

#### Time Zone Variables

MySQL Server maintains several time zone settings:

* The system time zone. When the server starts, it attempts to determine the time zone of the host machine automatically and uses it to set the [**system\_time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_system_time_zone) system variable. The value does not change thereafter.

To explicitly specify the system time zone for MySQL Server at startup, set the **TZ** environment variable before you start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld). If you start the server using [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe), its [--timezone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqld_safe_timezone) option provides another way to set the system time zone. The permissible values for **TZ** and [--timezone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqld_safe_timezone) are system dependent. Consult your operating system documentation to see what values are acceptable.

* The server current time zone. The global [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) system variable indicates the time zone the server currently is operating in. The initial [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) value is **'SYSTEM'**, which indicates that the server time zone is the same as the system time zone.

**Note**

If set to **SYSTEM**, every MySQL function call that requires a time zone calculation makes a system library call to determine the current system time zone. This call may be protected by a global mutex, resulting in contention.

The initial global server time zone value can be specified explicitly at startup with the [--default-time-zone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_default-time-zone) option on the command line, or you can use the following line in an option file:

default-time-zone='***timezone***'

If you have the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege), you can set the global server time zone value at runtime with this statement:

SET GLOBAL time\_zone = ***timezone***;

* Per-session time zones. Each client that connects has its own session time zone setting, given by the session [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) variable. Initially, the session variable takes its value from the global [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) variable, but the client can change its own time zone with this statement:
* SET time\_zone = ***timezone***;

The session time zone setting affects display and storage of time values that are zone-sensitive. This includes the values displayed by functions such as [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now) or [**CURTIME()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_curtime), and values stored in and retrieved from [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns. Values for [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns are converted from the session time zone to UTC for storage, and from UTC to the session time zone for retrieval.

The session time zone setting does not affect values displayed by functions such as [**UTC\_TIMESTAMP()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_utc-timestamp) or values in [**DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime), [**TIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#time), or [**DATETIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) columns. Nor are values in those data types stored in UTC; the time zone applies for them only when converting from [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) values. If you want locale-specific arithmetic for [**DATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime), [**TIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#time), or [**DATETIME**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) values, convert them to UTC, perform the arithmetic, and then convert back.

The current global and session time zone values can be retrieved like this:

SELECT @@GLOBAL.time\_zone, @@SESSION.time\_zone;

***timezone*** values can be given in several formats, none of which are case-sensitive:

* As the value **'SYSTEM'**, indicating that the server time zone is the same as the system time zone.
* As a string indicating an offset from UTC of the form **[*H*]*H*:*MM***, prefixed with a **+** or **-**, such as **'+10:00'**, **'-6:00'**, or **'+05:30'**. A leading zero can optionally be used for hours values less than 10; MySQL prepends a leading zero when storing and retriving the value in such cases. MySQL converts **'-00:00'** or **'-0:00'** to **'+00:00'**.

Prior to MySQL 8.0.19, this value had to be in the range **'-12:59'** to **'+13:00'**, inclusive; beginning with MySQL 8.0.19, the permitted range is **'-13:59'** to **'+14:00'**, inclusive.

* As a named time zone, such as **'Europe/Helsinki'**, **'US/Eastern'**, **'MET'**, or **'UTC'**.

**Note**

Named time zones can be used only if the time zone information tables in the **mysql** database have been created and populated. Otherwise, use of a named time zone results in an error:

mysql> **SET time\_zone = 'UTC';**

ERROR 1298 (HY000): Unknown or incorrect time zone: 'UTC'

#### Populating the Time Zone Tables

Several tables in the **mysql** system schema exist to store time zone information (see [Section 5.3, “The mysql System Schema”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-schema)). The MySQL installation procedure creates the time zone tables, but does not load them. To do so manually, use the following instructions.

**Note**

Loading the time zone information is not necessarily a one-time operation because the information changes occasionally. When such changes occur, applications that use the old rules become out of date and you may find it necessary to reload the time zone tables to keep the information used by your MySQL server current. See [Staying Current with Time Zone Changes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-upgrades).

If your system has its own zoneinfo database (the set of files describing time zones), use the [**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql) program to load the time zone tables. Examples of such systems are Linux, macOS, FreeBSD, and Solaris. One likely location for these files is the /usr/share/zoneinfo directory. If your system has no zoneinfo database, you can use a downloadable package, as described later in this section.

To load the time zone tables from the command line, pass the zoneinfo directory path name to [**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql) and send the output into the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) program. For example:

mysql\_tzinfo\_to\_sql /usr/share/zoneinfo | mysql -u root -p mysql

The [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) command shown here assumes that you connect to the server using an account such as **root** that has privileges for modifying tables in the **mysql** system schema. Adjust the connection parameters as required.

[**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql) reads your system's time zone files and generates SQL statements from them. [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) processes those statements to load the time zone tables.

[**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql) also can be used to load a single time zone file or generate leap second information:

* To load a single time zone file ***tz\_file*** that corresponds to a time zone name ***tz\_name***, invoke [**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql) like this:
* mysql\_tzinfo\_to\_sql ***tz\_file*** ***tz\_name*** | mysql -u root -p mysql

With this approach, you must execute a separate command to load the time zone file for each named zone that the server needs to know about.

* If your time zone must account for leap seconds, initialize leap second information like this, where ***tz\_file*** is the name of your time zone file:
* mysql\_tzinfo\_to\_sql --leap ***tz\_file*** | mysql -u root -p mysql

After running [**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql), restart the server so that it does not continue to use any previously cached time zone data.

If your system has no zoneinfo database (for example, Windows), you can use a package containing SQL statements that is available for download at the MySQL Developer Zone:

<https://dev.mysql.com/downloads/timezones.html>

**Warning**

Do not use a downloadable time zone package if your system has a zoneinfo database. Use the [**mysql\_tzinfo\_to\_sql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql-tzinfo-to-sql) utility instead. Otherwise, you may cause a difference in datetime handling between MySQL and other applications on your system.

To use an SQL-statement time zone package that you have downloaded, unpack it, then load the unpacked file contents into the time zone tables:

mysql -u root -p mysql < ***file\_name***

Then restart the server.

**Warning**

Do not use a downloadable time zone package that contains **MyISAM** tables. That is intended for older MySQL versions. MySQL now uses **InnoDB** for the time zone tables. Trying to replace them with **MyISAM** tables causes problems.

#### Staying Current with Time Zone Changes

When time zone rules change, applications that use the old rules become out of date. To stay current, it is necessary to make sure that your system uses current time zone information is used. For MySQL, there are multiple factors to consider in staying current:

* The operating system time affects the value that the MySQL server uses for times if its time zone is set to **SYSTEM**. Make sure that your operating system is using the latest time zone information. For most operating systems, the latest update or service pack prepares your system for the time changes. Check the website for your operating system vendor for an update that addresses the time changes.
* If you replace the system's /etc/localtime time zone file with a version that uses rules differing from those in effect at [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) startup, restart [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) so that it uses the updated rules. Otherwise, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) might not notice when the system changes its time.
* If you use named time zones with MySQL, make sure that the time zone tables in the **mysql** database are up to date:
  + If your system has its own zoneinfo database, reload the MySQL time zone tables whenever the zoneinfo database is updated.
  + For systems that do not have their own zoneinfo database, check the MySQL Developer Zone for updates. When a new update is available, download it and use it to replace the content of your current time zone tables.

For instructions for both methods, see [Populating the Time Zone Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-installation). [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) caches time zone information that it looks up, so after updating the time zone tables, restart [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to make sure that it does not continue to serve outdated time zone data.

If you are uncertain whether named time zones are available, for use either as the server's time zone setting or by clients that set their own time zone, check whether your time zone tables are empty. The following query determines whether the table that contains time zone names has any rows:

mysql> **SELECT COUNT(\*) FROM mysql.time\_zone\_name;**

+----------+

| COUNT(\*) |

+----------+

| 0 |

+----------+

A count of zero indicates that the table is empty. In this case, no applications currently are using named time zones, and you need not update the tables (unless you want to enable named time zone support). A count greater than zero indicates that the table is not empty and that its contents are available to be used for named time zone support. In this case, be sure to reload your time zone tables so that applications that use named time zones can obtain correct query results.

To check whether your MySQL installation is updated properly for a change in Daylight Saving Time rules, use a test like the one following. The example uses values that are appropriate for the 2007 DST 1-hour change that occurs in the United States on March 11 at 2 a.m.

The test uses this query:

SELECT

CONVERT\_TZ('2007-03-11 2:00:00','US/Eastern','US/Central') AS time1,

CONVERT\_TZ('2007-03-11 3:00:00','US/Eastern','US/Central') AS time2;

The two time values indicate the times at which the DST change occurs, and the use of named time zones requires that the time zone tables be used. The desired result is that both queries return the same result (the input time, converted to the equivalent value in the 'US/Central' time zone).

Before updating the time zone tables, you see an incorrect result like this:

+---------------------+---------------------+

| time1 | time2 |

+---------------------+---------------------+

| 2007-03-11 01:00:00 | 2007-03-11 02:00:00 |

+---------------------+---------------------+

After updating the tables, you should see the correct result:

+---------------------+---------------------+

| time1 | time2 |

+---------------------+---------------------+

| 2007-03-11 01:00:00 | 2007-03-11 01:00:00 |

+---------------------+---------------------+

#### Time Zone Leap Second Support

Leap second values are returned with a time part that ends with **:59:59**. This means that a function such as [**NOW()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_now) can return the same value for two or three consecutive seconds during the leap second. It remains true that literal temporal values having a time part that ends with **:59:60** or **:59:61** are considered invalid.

If it is necessary to search for [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) values one second before the leap second, anomalous results may be obtained if you use a comparison with **'*YYYY-MM-DD hh:mm:ss*'** values. The following example demonstrates this. It changes the session time zone to UTC so there is no difference between internal [**TIMESTAMP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#datetime) values (which are in UTC) and displayed values (which have time zone correction applied).

mysql> **CREATE TABLE t1 (**

**a INT,**

**ts TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,**

**PRIMARY KEY (ts)**

**);**

Query OK, 0 rows affected (0.01 sec)

mysql> **-- change to UTC**

mysql> **SET time\_zone = '+00:00';**

Query OK, 0 rows affected (0.00 sec)

mysql> **-- Simulate NOW() = '2008-12-31 23:59:59'**

mysql> **SET timestamp = 1230767999;**

Query OK, 0 rows affected (0.00 sec)

mysql> **INSERT INTO t1 (a) VALUES (1);**

Query OK, 1 row affected (0.00 sec)

mysql> **-- Simulate NOW() = '2008-12-31 23:59:60'**

mysql> **SET timestamp = 1230768000;**

Query OK, 0 rows affected (0.00 sec)

mysql> **INSERT INTO t1 (a) VALUES (2);**

Query OK, 1 row affected (0.00 sec)

mysql> **-- values differ internally but display the same**

mysql> **SELECT a, ts, UNIX\_TIMESTAMP(ts) FROM t1;**

+------+---------------------+--------------------+

| a | ts | UNIX\_TIMESTAMP(ts) |

+------+---------------------+--------------------+

| 1 | 2008-12-31 23:59:59 | 1230767999 |

| 2 | 2008-12-31 23:59:59 | 1230768000 |

+------+---------------------+--------------------+

2 rows in set (0.00 sec)

mysql> **-- only the non-leap value matches**

mysql> **SELECT \* FROM t1 WHERE ts = '2008-12-31 23:59:59';**

+------+---------------------+

| a | ts |

+------+---------------------+

| 1 | 2008-12-31 23:59:59 |

+------+---------------------+

1 row in set (0.00 sec)

mysql> **-- the leap value with seconds=60 is invalid**

mysql> **SELECT \* FROM t1 WHERE ts = '2008-12-31 23:59:60';**

Empty set, 2 warnings (0.00 sec)

To work around this, you can use a comparison based on the UTC value actually stored in the column, which has the leap second correction applied:

mysql> **-- selecting using UNIX\_TIMESTAMP value return leap value**

mysql> **SELECT \* FROM t1 WHERE UNIX\_TIMESTAMP(ts) = 1230768000;**

+------+---------------------+

| a | ts |

+------+---------------------+

| 2 | 2008-12-31 23:59:59 |

+------+---------------------+

1 row in set (0.00 sec)

### 5.1.16资源组

MySQL supports creation and management of resource groups, and permits assigning threads running within the server to particular groups so that threads execute according to the resources available to the group. Group attributes enable control over its resources, to enable or restrict resource consumption by threads in the group. DBAs can modify these attributes as appropriate for different workloads.

Currently, CPU time is a manageable resource, represented by the concept of “virtual CPU” as a term that includes CPU cores, hyperthreads, hardware threads, and so forth. The server determines at startup how many virtual CPUs are available, and database administrators with appropriate privileges can associate these CPUs with resource groups and assign threads to groups.

For example, to manage execution of batch jobs that need not execute with high priority, a DBA can create a **Batch** resource group, and adjust its priority up or down depending on how busy the server is. (Perhaps batch jobs assigned to the group should run at lower priority during the day and at higher priority during the night.) The DBA can also adjust the set of CPUs available to the group. Groups can be enabled or disabled to control whether threads are assignable to them.

The following sections describe aspects of resource group use in MySQL:

* [Resource Group Elements](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-elements)
* [Resource Group Attributes](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-attributes)
* [Resource Group Management](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-management)
* [Resource Group Replication](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-replication)
* [Resource Group Restrictions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-restrictions)

**Important**

On some platforms or MySQL server configurations, resource groups are unavailable or have limitations. In particular, Linux systems might require a manual step for some installation methods. For details, see [Resource Group Restrictions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-restrictions).

#### Resource Group Elements

These capabilities provide the SQL interface for resource group management in MySQL:

* SQL statements enable creating, altering, and dropping resource groups, and enable assigning threads to resource groups. An optimizer hint enables assigning individual statements to resource groups.
* Resource group privileges provide control over which users can perform resource group operations.
* The [**INFORMATION\_SCHEMA.RESOURCE\_GROUPS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-resource-groups-table) table exposes information about resource group definitions and the Performance Schema [**threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-threads-table) table shows the resource group assignment for each thread.
* Status variables provide execution counts for each management SQL statement.

#### Resource Group Attributes

Resource groups have attributes that define the group. All attributes can be set at group creation time. Some attributes are fixed at creation time; others can be modified any time thereafter.

These attributes are defined at resource group creation time and cannot be modified:

* Each group has a name. Resource group names are identifiers like table and column names, and need not be quoted in SQL statements unless they contain special characters or are reserved words. Group names are not case-sensitive and may be up to 64 characters long.
* Each group has a type, which is either **SYSTEM** or **USER**. The resource group type affects the range of priority values assignable to the group, as described later. This attribute together with the differences in permitted priorities enables system threads to be identified so as to protect them from contention for CPU resources against user threads.

System and user threads correspond to background and foreground threads as listed in the Performance Schema [**threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-threads-table) table.

These attributes are defined at resource group creation time and can be modified any time thereafter:

* The CPU affinity is the set of virtual CPUs the resource group can use. An affinity can be any nonempty subset of the available CPUs. If a group has no affinity, it can use all available CPUs.
* The thread priority is the execution priority for threads assigned to the resource group. Priority values range from -20 (highest priority) to 19 (lowest priority). The default priority is 0, for both system and user groups.

System groups are permitted a higher priority than user groups, ensuring that user threads never have a higher priority than system threads:

* + For system resource groups, the permitted priority range is -20 to 0.
  + For user resource groups, the permitted priority range is 0 to 19.
* Each group can be enabled or disabled, affording administrators control over thread assignment. Threads can be assigned only to enabled groups.

#### Resource Group Management

By default, there is one system group and one user group, named **SYS\_default** and **USR\_default**, respectively. These default groups cannot be dropped and their attributes cannot be modified. Each default group has no CPU affinity and priority 0.

Newly created system and user threads are assigned to the **SYS\_default** and **USR\_default** groups, respectively.

For user-defined resource groups, all attributes are assigned at group creation time. After a group has been created, its attributes can be modified, with the exception of the name and type attributes.

To create and manage user-defined resource groups, use these SQL statements:

* [**CREATE RESOURCE GROUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-resource-group) creates a new group. See [Section 13.7.2.2, “CREATE RESOURCE GROUP Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-resource-group).
* [**ALTER RESOURCE GROUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-resource-group) modifies an existing group. See [Section 13.7.2.1, “ALTER RESOURCE GROUP Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-resource-group).
* [**DROP RESOURCE GROUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-resource-group) drops an existing group. See [Section 13.7.2.3, “DROP RESOURCE GROUP Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-resource-group).

Those statements require the [**RESOURCE\_GROUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_resource-group-admin) privilege.

To manage resource group assignments, use these capabilities:

* [**SET RESOURCE GROUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-resource-group) assigns threads to a group. See [Section 13.7.2.4, “SET RESOURCE GROUP Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-resource-group).
* The [**RESOURCE\_GROUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-resource-group) optimizer hint assigns individual statements to a group. See [Section 8.9.3, “Optimizer Hints”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints).

Those operations require the [**RESOURCE\_GROUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_resource-group-admin) or [**RESOURCE\_GROUP\_USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_resource-group-user) privilege.

Resource group definitions are stored in the **resource\_groups** data dictionary table so that groups persist across server restarts. Because **resource\_groups** is part of the data dictionary, it is not directly accessible by users. Resource group information is available using the [**INFORMATION\_SCHEMA.RESOURCE\_GROUPS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-resource-groups-table) table, which is implemented as a view on the data dictionary table. See [Section 26.3.26, “The INFORMATION\_SCHEMA RESOURCE\_GROUPS Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-resource-groups-table).

Initially, the [**RESOURCE\_GROUPS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-resource-groups-table) table has these rows describing the default groups:

mysql> **SELECT \* FROM INFORMATION\_SCHEMA.RESOURCE\_GROUPS\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RESOURCE\_GROUP\_NAME: USR\_default

RESOURCE\_GROUP\_TYPE: USER

RESOURCE\_GROUP\_ENABLED: 1

VCPU\_IDS: 0-3

THREAD\_PRIORITY: 0

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 2. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RESOURCE\_GROUP\_NAME: SYS\_default

RESOURCE\_GROUP\_TYPE: SYSTEM

RESOURCE\_GROUP\_ENABLED: 1

VCPU\_IDS: 0-3

THREAD\_PRIORITY: 0

The **THREAD\_PRIORITY** values are 0, indicating the default priority. The **VCPU\_IDS** values show a range comprising all available CPUs. For the default groups, the displayed value varies depending on the system on which the MySQL server runs.

Earlier discussion mentioned a scenario involving a resource group named **Batch** to manage execution of batch jobs that need not execute with high priority. To create such a group, use a statement similar to this:

CREATE RESOURCE GROUP Batch

TYPE = USER

VCPU = 2-3 -- assumes a system with at least 4 CPUs

THREAD\_PRIORITY = 10;

To verify that the resource group was created as expected, check the [**RESOURCE\_GROUPS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-resource-groups-table) table:

mysql> **SELECT \* FROM INFORMATION\_SCHEMA.RESOURCE\_GROUPS**

**WHERE RESOURCE\_GROUP\_NAME = 'Batch'\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RESOURCE\_GROUP\_NAME: Batch

RESOURCE\_GROUP\_TYPE: USER

RESOURCE\_GROUP\_ENABLED: 1

VCPU\_IDS: 2-3

THREAD\_PRIORITY: 10

If the **THREAD\_PRIORITY** value is 0 rather than 10, check whether your platform or system configuration limits the resource group capability; see [Resource Group Restrictions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#resource-group-restrictions).

To assign a thread to the **Batch** group, do this:

SET RESOURCE GROUP Batch FOR ***thread\_id***;

Thereafter, statements in the named thread execute with **Batch** group resources.

If a session's own current thread should be in the **Batch** group, execute this statement within the session:

SET RESOURCE GROUP Batch;

Thereafter, statements in the session execute with **Batch** group resources.

To execute a single statement using the **Batch** group, use the [**RESOURCE\_GROUP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-resource-group) optimizer hint:

INSERT /\*+ RESOURCE\_GROUP(Batch) \*/ INTO t2 VALUES(2);

Threads assigned to the **Batch** group execute with its resources, which can be modified as desired:

* For times when the system is highly loaded, decrease the number of CPUs assigned to the group, lower its priority, or (as shown) both:
* ALTER RESOURCE GROUP Batch
* VCPU = 3
* THREAD\_PRIORITY = 19;
* For times when the system is lightly loaded, increase the number of CPUs assigned to the group, raise its priority, or (as shown) both:
* ALTER RESOURCE GROUP Batch
* VCPU = 0-3
* THREAD\_PRIORITY = 0;

#### Resource Group Replication

Resource group management is local to the server on which it occurs. Resource group SQL statements and modifications to the **resource\_groups** data dictionary table are not written to the binary log and are not replicated.

#### Resource Group Restrictions

On some platforms or MySQL server configurations, resource groups are unavailable or have limitations:

* Resource groups are unavailable if the thread pool plugin is installed.
* Resource groups are unavailable on macOS, which provides no API for binding CPUs to a thread.
* On FreeBSD and Solaris, resource group thread priorities are ignored. (Effectively, all threads run at priority 0.) Attempts to change priorities result in a warning:
* mysql> **ALTER RESOURCE GROUP abc THREAD\_PRIORITY = 10;**
* Query OK, 0 rows affected, 1 warning (0.18 sec)
* mysql> **SHOW WARNINGS;**
* +---------+------+-------------------------------------------------------------+
* | Level | Code | Message |
* +---------+------+-------------------------------------------------------------+
* | Warning | 4560 | Attribute thread\_priority is ignored (using default value). |
* +---------+------+-------------------------------------------------------------+
* On Linux, resource groups thread priorities are ignored unless the **CAP\_SYS\_NICE** capability is set. Granting **CAP\_SYS\_NICE** capability to a process enables a range of privileges; consult <http://man7.org/linux/man-pages/man7/capabilities.7.html> for the full list. Please be careful when enabling this capability.

On Linux platforms using systemd and kernel support for Ambient Capabilities (Linux 4.3 or newer), the recommended way to enable **CAP\_SYS\_NICE** capability is to modify the MySQL service file and leave the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) binary unmodified. To adjust the service file for MySQL, use this procedure:

* 1. Run the appropriate command for your platform:
     + Oracle Linux, Red Hat, and Fedora systems:
     + shell> **sudo systemctl edit mysqld**
     + SUSE, Ubuntu, and Debian systems:
     + shell> **sudo systemctl edit mysql**
  2. Using an editor, add the following text to the service file:
  3. [Service]
  4. AmbientCapabilities=CAP\_SYS\_NICE
  5. Restart the MySQL service.

If you cannot enable the **CAP\_SYS\_NICE** capability as just described, it can be set manually using the **setcap** command, specifying the path name to the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) executable (this requires **sudo** access). You can check the capabilities using **getcap**. For example:

shell> **sudo setcap cap\_sys\_nice+ep */path/to/mysqld***

shell> **getcap */path/to/mysqld***

***/path/to/mysqld*** = cap\_sys\_nice+ep

As a safety measure, restrict execution of the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) binary to the **root** user and users with **mysql** group membership:

shell> **sudo chown root:mysql */path/to/mysqld***

shell> **sudo chmod 0750 */path/to/mysqld***

**Important**

If manual use of **setcap** is required, it must be performed after each reinstall.

* On Windows, threads run at one of five thread priority levels. The resource group thread priority range of -20 to 19 maps onto those levels as indicated in the following table.

**Table 5.5 Resource Group Thread Priority on Windows**

| **Priority Range** | **Windows Priority Level** |
| --- | --- |
| -20 to -10 | **THREAD\_PRIORITY\_HIGHEST** |
| -9 to -1 | **THREAD\_PRIORITY\_ABOVE\_NORMAL** |
| 0 | **THREAD\_PRIORITY\_NORMAL** |
| 1 to 10 | **THREAD\_PRIORITY\_BELOW\_NORMAL** |
| 11 to 19 | **THREAD\_PRIORITY\_LOWEST** |

### 5.1.17 服务器端帮助支持

MySQL Server supports a [**HELP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#help) statement that returns information from the MySQL Reference Manual (see [Section 13.8.3, “HELP Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#help)). This information is stored in several tables in the **mysql** schema (see [Section 5.3, “The mysql System Schema”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-schema)). Proper operation of the [**HELP**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#help) statement requires that these help tables be initialized.

For a new installation of MySQL using a binary or source distribution on Unix, help-table content initialization occurs when you initialize the data directory (see [Section 2.10.1, “Initializing the Data Directory”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#data-directory-initialization)). For an RPM distribution on Linux or binary distribution on Windows, content initialization occurs as part of the MySQL installation process.

For a MySQL upgrade using a binary distribution, help-table content is upgraded automatically by the server as of MySQL 8.0.16. Prior to MySQL 8.0.16, the content is not upgraded automatically, but you can upgrade it manually. Locate the fill\_help\_tables.sql file in the share or share/mysql directory. Change location into that directory and process the file with the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) client as follows:

mysql -u root -p mysql < fill\_help\_tables.sql

The command shown here assumes that you connect to the server using an account such as **root** that has privileges for modifying tables in the **mysql** schema. Adjust the connection parameters as required.

Prior to MySQL 8.0.16, if you are working with Git and a MySQL development source tree, the source tree contains only a “stub” version of fill\_help\_tables.sql. To obtain a non-stub copy, use one from a source or binary distribution.

**Note**

Each MySQL series has its own series-specific reference manual, so help-table content is series specific as well. This has implications for replication because help-table content should match the MySQL series. If you load MySQL 8.0 help content into a MySQL 8.0 replication server, it does not make sense to replicate that content to a replica server from a different MySQL series and for which that content is not appropriate. For this reason, as you upgrade individual servers in a replication scenario, you should upgrade each server's help tables, using the instructions given earlier. (Manual help-content upgrade is necessary only for replication servers from versions lower than 8.0.16. As mentioned in the preceding instructions, content upgrades occur automatically as of MySQL 8.0.16.)

### 5.1.18 服务器端追踪你客户端session变化

The MySQL server implements several session state trackers. A client can enable these trackers to receive notification of changes to its session state.

One use for the tracker mechanism is to provide a means for MySQL connectors and client applications to determine whether any session context is available to permit session migration from one server to another. (To change sessions in a load-balanced environment, it is necessary to detect whether there is session state to take into consideration when deciding whether a switch can be made.)

Another use for the tracker mechanism is to permit applications to know when transactions can be moved from one session to another. Transaction state tracking enables this, which is useful for applications that may wish to move transactions from a busy server to one that is less loaded. For example, a load-balancing connector managing a client connection pool could move transactions between available sessions in the pool.

However, session switching cannot be done at arbitrary times. If a session is in the middle of a transaction for which reads or writes have been done, switching to a different session implies a transaction rollback on the original session. A session switch must be done only when a transaction does not yet have any reads or writes performed within it.

Examples of when transactions might reasonably be switched:

* Immediately after [**START TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit)
* After [**COMMIT AND CHAIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit)

In addition to knowing transaction state, it is useful to know transaction characteristics, so as to use the same characteristics if the transaction is moved to a different session. The following characteristics are relevant for this purpose:

READ ONLY

READ WRITE

ISOLATION LEVEL

WITH CONSISTENT SNAPSHOT

To support the preceding session-switching activities, notification is available for these types of client session state information:

* Changes to these attributes of client session state:
  + The default schema (database).
  + Session-specific values for system variables.
  + User-defined variables.
  + Temporary tables.
  + Prepared statements.

The [**session\_track\_state\_change**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_state_change) system variable controls this tracker.

* Changes to the default schema name. The [**session\_track\_schema**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_schema) system variable controls this tracker.
* Changes to the session values of system variables. The [**session\_track\_system\_variables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_system_variables) system variable controls this tracker.
* Available GTIDs. The [**session\_track\_gtids**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_gtids) system variable controls this tracker.
* Information about transaction state and characteristics. The [**session\_track\_transaction\_info**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_session_track_transaction_info) system variable controls this tracker.

For descriptions of the tracker-related system variables, see [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables). Those system variables permit control over which change notifications occur, but do not provide a way to access notification information. Notification occurs in the MySQL client/server protocol, which includes tracker information in OK packets so that session state changes can be detected. To enable client applications to extract state-change information from OK packets returned by the server, the MySQL C API provides a pair of functions:

* [**mysql\_session\_track\_get\_first()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-session-track-get-first.html) fetches the first part of the state-change information received from the server. See [mysql\_session\_track\_get\_first()](https://dev.mysql.com/doc/c-api/8.0/en/mysql-session-track-get-first.html).
* [**mysql\_session\_track\_get\_next()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-session-track-get-next.html) fetches any remaining state-change information received from the server. Following a successful call to [**mysql\_session\_track\_get\_first()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-session-track-get-first.html), call this function repeatedly as long as it returns success. See [mysql\_session\_track\_get\_next()](https://dev.mysql.com/doc/c-api/8.0/en/mysql-session-track-get-next.html).

The **mysqltest** program has **disable\_session\_track\_info** and **enable\_session\_track\_info** commands that control whether session tracker notifications occur. You can use these commands to see from the command line what notifications SQL statements produce. Suppose that a file testscript contains the following **mysqltest** script:

DROP TABLE IF EXISTS test.t1;

CREATE TABLE test.t1 (i INT, f FLOAT);

--enable\_session\_track\_info

SET @@SESSION.session\_track\_schema=ON;

SET @@SESSION.session\_track\_system\_variables='\*';

SET @@SESSION.session\_track\_state\_change=ON;

USE information\_schema;

SET NAMES 'utf8mb4';

SET @@SESSION.session\_track\_transaction\_info='CHARACTERISTICS';

SET TRANSACTION ISOLATION LEVEL SERIALIZABLE;

SET TRANSACTION READ WRITE;

START TRANSACTION;

SELECT 1;

INSERT INTO test.t1 () VALUES();

INSERT INTO test.t1 () VALUES(1, RAND());

COMMIT;

Run the script as follows to see the information provided by the enabled trackers. For a description of the **Tracker:** information displayed by **mysqltest** for the various trackers, see [mysql\_session\_track\_get\_first()](https://dev.mysql.com/doc/c-api/8.0/en/mysql-session-track-get-first.html).

shell> **mysqltest < testscript**

DROP TABLE IF EXISTS test.t1;

CREATE TABLE test.t1 (i INT, f FLOAT);

SET @@SESSION.session\_track\_schema=ON;

SET @@SESSION.session\_track\_system\_variables='\*';

-- Tracker : SESSION\_TRACK\_SYSTEM\_VARIABLES

-- session\_track\_system\_variables

-- \*

SET @@SESSION.session\_track\_state\_change=ON;

-- Tracker : SESSION\_TRACK\_SYSTEM\_VARIABLES

-- session\_track\_state\_change

-- ON

USE information\_schema;

-- Tracker : SESSION\_TRACK\_SCHEMA

-- information\_schema

-- Tracker : SESSION\_TRACK\_STATE\_CHANGE

-- 1

SET NAMES 'utf8mb4';

-- Tracker : SESSION\_TRACK\_SYSTEM\_VARIABLES

-- character\_set\_client

-- utf8mb4

-- character\_set\_connection

-- utf8mb4

-- character\_set\_results

-- utf8mb4

-- Tracker : SESSION\_TRACK\_STATE\_CHANGE

-- 1

SET @@SESSION.session\_track\_transaction\_info='CHARACTERISTICS';

-- Tracker : SESSION\_TRACK\_SYSTEM\_VARIABLES

-- session\_track\_transaction\_info

-- CHARACTERISTICS

-- Tracker : SESSION\_TRACK\_STATE\_CHANGE

-- 1

-- Tracker : SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS

--

-- Tracker : SESSION\_TRACK\_TRANSACTION\_STATE

-- \_\_\_\_\_\_\_\_

SET TRANSACTION ISOLATION LEVEL SERIALIZABLE;

-- Tracker : SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS

-- SET TRANSACTION ISOLATION LEVEL SERIALIZABLE;

SET TRANSACTION READ WRITE;

-- Tracker : SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS

-- SET TRANSACTION ISOLATION LEVEL SERIALIZABLE; SET TRANSACTION READ WRITE;

START TRANSACTION;

-- Tracker : SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS

-- SET TRANSACTION ISOLATION LEVEL SERIALIZABLE; START TRANSACTION READ WRITE;

-- Tracker : SESSION\_TRACK\_TRANSACTION\_STATE

-- T\_\_\_\_\_\_\_

SELECT 1;

1

1

-- Tracker : SESSION\_TRACK\_TRANSACTION\_STATE

-- T\_\_\_\_\_S\_

INSERT INTO test.t1 () VALUES();

-- Tracker : SESSION\_TRACK\_TRANSACTION\_STATE

-- T\_\_\_W\_S\_

INSERT INTO test.t1 () VALUES(1, RAND());

-- Tracker : SESSION\_TRACK\_TRANSACTION\_STATE

-- T\_\_\_WsS\_

COMMIT;

-- Tracker : SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS

--

-- Tracker : SESSION\_TRACK\_TRANSACTION\_STATE

-- \_\_\_\_\_\_\_\_

ok

Preceding the [**START TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statement, two [**SET TRANSACTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-transaction) statements execute that set the isolation level and access mode characteristics for the next transaction. The **SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS** value indicates those next-transaction values that have been set.

Following the [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statement that ends the transaction, the **SESSION\_TRACK\_TRANSACTION\_CHARACTERISTICS** value is reported as empty. This indicates that the next-transaction characteristics that were set preceding the start of the transaction have been reset, and that the session defaults apply. To track changes to those session defaults, track the session values of the [**transaction\_isolation**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_isolation) and [**transaction\_read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_transaction_read_only) system variables.

### 5.1.19 服务端关闭进程

The server shutdown process takes place as follows:

1. The shutdown process is initiated.

This can occur initiated several ways. For example, a user with the [**SHUTDOWN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_shutdown) privilege can execute a [**mysqladmin shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) command. [**mysqladmin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) can be used on any platform supported by MySQL. Other operating system-specific shutdown initiation methods are possible as well: The server shuts down on Unix when it receives a **SIGTERM** signal. A server running as a service on Windows shuts down when the services manager tells it to.

1. The server creates a shutdown thread if necessary.

Depending on how shutdown was initiated, the server might create a thread to handle the shutdown process. If shutdown was requested by a client, a shutdown thread is created. If shutdown is the result of receiving a **SIGTERM** signal, the signal thread might handle shutdown itself, or it might create a separate thread to do so. If the server tries to create a shutdown thread and cannot (for example, if memory is exhausted), it issues a diagnostic message that appears in the error log:

Error: Can't create thread to kill server

1. The server stops accepting new connections.

To prevent new activity from being initiated during shutdown, the server stops accepting new client connections by closing the handlers for the network interfaces to which it normally listens for connections: the TCP/IP port, the Unix socket file, the Windows named pipe, and shared memory on Windows.

1. The server terminates current activity.

For each thread associated with a client connection, the server breaks the connection to the client and marks the thread as killed. Threads die when they notice that they are so marked. Threads for idle connections die quickly. Threads that currently are processing statements check their state periodically and take longer to die. For additional information about thread termination, see [Section 13.7.8.4, “KILL Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#kill), in particular for the instructions about killed [**REPAIR TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#repair-table) or [**OPTIMIZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#optimize-table) operations on **MyISAM** tables.

For threads that have an open transaction, the transaction is rolled back. If a thread is updating a nontransactional table, an operation such as a multiple-row [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) or [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) may leave the table partially updated because the operation can terminate before completion.

If the server is a replication source server, it treats threads associated with currently connected replicas like other client threads. That is, each one is marked as killed and exits when it next checks its state.

If the server is a replica server, it stops the replication I/O and SQL threads, if they are active, before marking client threads as killed. The SQL thread is permitted to finish its current statement (to avoid causing replication problems), and then stops. If the SQL thread is in the middle of a transaction at this point, the server waits until the current replication event group (if any) has finished executing, or until the user issues a [**KILL QUERY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#kill) or [**KILL CONNECTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#kill) statement. See also [Section 13.4.2.10, “STOP SLAVE | REPLICA Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#stop-slave). Since nontransactional statements cannot be rolled back, in order to guarantee crash-safe replication, only transactional tables should be used.

**Note**

To guarantee crash safety on the replica, you must run the replica with [--relay-log-recovery](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_recovery) enabled.

See also [Section 17.2.4, “Relay Log and Replication Metadata Repositories”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replica-logs)).

1. The server shuts down or closes storage engines.

At this stage, the server flushes the table cache and closes all open tables.

Each storage engine performs any actions necessary for tables that it manages. **InnoDB** flushes its buffer pool to disk (unless [**innodb\_fast\_shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_fast_shutdown) is 2), writes the current LSN to the tablespace, and terminates its own internal threads. **MyISAM** flushes any pending index writes for a table.

1. The server exits.

To provide information to management processes, the server returns one of the exit codes described in the following list. The phrase in parentheses indicates the action taken by systemd in response to the code, for platforms on which systemd is used to manage the server.

* 0 = successful termination (no restart done)
* 1 = unsuccessful termination (no restart done)
* 2 = unsuccessful termination (restart done)

## 5.2 MySQL数据目录

由MySQL服务器管理的信息存储在一个被称为数据目录的目录下。下面的列表简要地描述了通常在数据目录中发现的项目，并附有其他信息的交叉参考。

- 数据目录的子目录。数据目录的每个子目录是一个数据库目录，对应于服务器管理的一个数据库。所有MySQL安装都有某些标准数据库。

o mysql目录对应于mysql系统模式，它包含MySQL服务器运行时需要的信息。这个数据库包含数据字典表和系统表。参见第5.3节，"mysql系统模式"。

o performance\_schema目录与Performance Schema相对应，它提供了用于在运行时检查服务器内部执行情况的信息。参见第27章，MySQL性能模式。

o sys目录与sys模式相对应，它提供了一组对象，以帮助更容易地解释性能模式信息。参见第28章，MySQL sys schema。

o ndbinfo目录与ndbinfo数据库相对应，它存储了NDB Cluster的特定信息（只存在于包含NDB Cluster的安装中）。参见章节 23.5.14, "ndbinfo: NDB Cluster信息数据库"。

其他子目录对应于由用户或应用程序创建的数据库。

注意

INFORMATION\_SCHEMA是一个标准的数据库，但是其实现没有使用相应的数据库目录。

- 由服务器编写的日志文件。见第5.4节，"MySQL服务器日志"。

- InnoDB表空间和日志文件。见第15章，InnoDB存储引擎。

- 默认/自动生成的SSL和RSA证书和密钥文件。见第6.3.3节，"创建SSL和RSA证书和密钥"。

- 服务器进程ID文件（当服务器正在运行时）。

- mysqld-auto.cnf文件，存储持久化的全局系统变量设置。参见第13.7.6.1节，"变量分配的SET语法"。

前面列表中的一些项目可以通过重新配置服务器而被重新安置在其他地方。此外，--datadir选项使数据目录本身的位置可以被改变。对于一个给定的MySQL安装，检查服务器配置以确定项目是否已被移动。

## 5.3 mysql系统模式

mysql模式是系统模式。它包含存储MySQL服务器运行时所需信息的表。一个广泛的分类是，mysql模式包含存储数据库对象元数据的数据字典表，以及用于其他操作目的的系统表。下面的讨论将系统表的集合进一步细分为更小的类别。

- 数据字典表

- 授权系统表

- 对象信息系统表

- 日志系统表

- 服务器端帮助系统表

- 时区系统表

- 复制系统表

- 优化器系统表

- 其他系统表

本节的其余部分列举了每个类别中的表，并附有其他信息的交叉参考。除非另有说明，数据字典表和系统表使用InnoDB存储引擎。

mysql系统表和数据字典表驻留在MySQL数据目录中名为mysql.ibd的单一InnoDB表空间文件中。以前，这些表是在mysql数据库目录下的单个表空间文件中创建的。

可以为mysql系统模式表空间启用静态数据加密。欲了解更多信息，请参见第15.13节 "InnoDB静态数据加密"。

数据字典表

这些表组成了数据字典，它包含关于数据库对象的元数据。有关其他信息，请参见第14章，MySQL数据字典。

重要信息

数据字典是MySQL 8.0中的新内容。与以前的MySQL版本相比，启用了数据字典的服务器需要一些一般的操作差异。详情请见第14.7节 "数据字典使用的差异"。此外，对于从MySQL 5.7升级到MySQL 8.0，升级过程与以前的MySQL版本有些不同，需要你通过检查特定的先决条件来验证安装的升级准备情况。欲了解更多信息，请参阅第2.11节 "升级MySQL"，特别是第2.11.5节 "为升级准备你的安装"。

- 目录。目录信息。

- character\_sets。关于可用字符集的信息。

- check\_constraints。关于在表上定义的CHECK约束的信息。参见第13.1.20.6节，"CHECK约束"。

- collations。关于每个字符集的拼写的信息。

- column\_statistics: 列值的柱状图统计。参见章节8.9.6, "优化器统计"。

- column\_type\_elements。关于列所使用的类型的信息。

- 列。有关表内列的信息。

- dd\_properties。一个标识数据字典属性的表，例如它的版本。服务器用它来确定数据字典是否必须升级到一个新的版本。

- events。关于Event Scheduler事件的信息。参见第25.4节，"使用事件调度器"。如果服务器以--skip-grant-tables选项启动，事件调度器被禁用，在表中注册的事件不会运行。参见第25.4.2节，"事件调度器的配置"。

- foreign\_keys, foreign\_key\_column\_usage: 关于外键的信息。

- index\_column\_usage。有关索引使用的列的信息。

- index\_partitions。有关索引使用的分区的信息。

- index\_stats。用于存储在执行ANALYZE TABLE时产生的动态索引统计数据。

- indexes: 关于表的索引的信息。

- innodb\_ddl\_log。存储用于崩溃安全的DDL操作的DDL日志。

- parameter\_type\_elements: 关于存储过程和函数参数的信息，以及关于存储函数返回值的信息。

- 参数。有关存储过程和函数的信息。参见第25.2节 "使用存储的程序"。

- resource\_groups: 关于资源组的信息。参见章节5.1.16, "资源组"。

- routines: 关于存储过程和函数的信息。参见第25.2节 "使用存储的例程"。

- schemata：关于schemata的信息。在MySQL中，模式是一个数据库，所以这个表提供了关于数据库的信息。

- st\_spatial\_reference\_systems。关于空间数据的可用空间参考系统的信息。

- table\_partition\_values: 关于表分区所使用的值的信息。

- table\_partitions: 有关表所使用的分区的信息。

- table\_stats: 当执行ANALYZE TABLE时产生的关于动态表统计的信息。

- tables: 关于数据库中的表的信息。

- tablespace\_files: 关于表空间使用的文件的信息。

- tablespaces: 关于活跃的表空间的信息。

- 触发器。关于触发器的信息。

- view\_routine\_usage: 关于视图和它们所使用的存储函数之间的依赖关系的信息。

- view\_table\_usage: 用于跟踪视图和其底层表之间的依赖关系。

数据字典表是不可见的。它们不能被SELECT读取，不会出现在SHOW TABLES的输出中，也不会在INFORMATION\_SCHEMA.TABLES表中列出，等等。然而，在大多数情况下，有相应的 INFORMATION\_SCHEMA 表可以被查询。从概念上讲，INFORMATION\_SCHEMA提供了一个视图，MySQL通过它来暴露数据字典元数据。例如，你不能直接从mysql.schemata表中选择。

mysql> **SELECT \* FROM mysql.schemata;**

ERROR 3554 (HY000): Access to data dictionary table 'mysql.schemata' is rejected.

Instead, select that information from the corresponding **INFORMATION\_SCHEMA** table:

mysql> **SELECT \* FROM INFORMATION\_SCHEMA.SCHEMATA\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CATALOG\_NAME: def

SCHEMA\_NAME: mysql

DEFAULT\_CHARACTER\_SET\_NAME: utf8mb4

DEFAULT\_COLLATION\_NAME: utf8mb4\_0900\_ai\_ci

SQL\_PATH: NULL

DEFAULT\_ENCRYPTION: NO

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 2. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CATALOG\_NAME: def

SCHEMA\_NAME: information\_schema

DEFAULT\_CHARACTER\_SET\_NAME: utf8

DEFAULT\_COLLATION\_NAME: utf8\_general\_ci

SQL\_PATH: NULL

DEFAULT\_ENCRYPTION: NO

...

There is no **INFORMATION\_SCHEMA** table that corresponds exactly to **mysql.indexes**, but [**INFORMATION\_SCHEMA.STATISTICS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-statistics-table) contains much of the same information.

As of yet, there are no **INFORMATION\_SCHEMA** tables that correspond exactly to **mysql.foreign\_keys**, **mysql.foreign\_key\_column\_usage**. The standard SQL way to obtain foreign key information is by using the **INFORMATION\_SCHEMA** [**REFERENTIAL\_CONSTRAINTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-referential-constraints-table) and [**KEY\_COLUMN\_USAGE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-key-column-usage-table) tables; these tables are now implemented as views on the **foreign\_keys**, **foreign\_key\_column\_usage**, and other data dictionary tables.

Some system tables from before MySQL 8.0 have been replaced by data dictionary tables and are no longer present in the **mysql** system schema:

* The **events** data dictionary table supersedes the **event** table from before MySQL 8.0.
* The **parameters** and **routines** data dictionary tables together supersede the **proc** table from before MySQL 8.0.

### Grant System Tables

These system tables contain grant information about user accounts and the privileges held by them. For additional information about the structure, contents, and purpose of the these tables, see [Section 6.2.3, “Grant Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#grant-tables).

As of MySQL 8.0, the grant tables are **InnoDB** (transactional) tables. Previously, these were **MyISAM** (nontransactional) tables. The change of grant-table storage engine underlies an accompanying change in MySQL 8.0 to the behavior of account-management statements such as [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user) and [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant). Previously, an account-management statement that named multiple users could succeed for some users and fail for others. The statements are now transactional and either succeed for all named users or roll back and have no effect if any error occurs.

**Note**

If MySQL is upgraded from an older version but the grant tables have not been upgraded from **MyISAM** to **InnoDB**, the server considers them read only and account-management statements produce an error. For upgrade instructions, see [Section 2.11, “Upgrading MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#upgrading).

* **user**: User accounts, global privileges, and other nonprivilege columns.
* **global\_grants**: Assignments of dynamic global privileges to users; see [Static Versus Dynamic Privileges](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#static-dynamic-privileges).
* **db**: Database-level privileges.
* **tables\_priv**: Table-level privileges.
* **columns\_priv**: Column-level privileges.
* **procs\_priv**: Stored procedure and function privileges.
* **proxies\_priv**: Proxy-user privileges.
* **default\_roles**: This table lists default roles to be activated after a user connects and authenticates, or executes [**SET ROLE DEFAULT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-role).
* **role\_edges**: This table lists edges for role subgraphs.

A given **user** table row might refer to a user account or a role. The server can distinquish whether a row represents a user account, a role, or both by consulting the **role\_edges** table for information about relations between authentication IDs.

* **password\_history**: Information about password changes.

### Object Information System Tables

These system tables contain information about components, loadable functions, and server-side plugins:

* **component**: The registry for server components installed using [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component). Any components listed in this table are installed by a loader service during the server startup sequence. See [Section 5.5.1, “Installing and Uninstalling Components”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#component-loading).
* **func**: The registry for loadable functions installed using [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable). During the normal startup sequence, the server loads functions registered in this table. If the server is started with the [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) option, functions registered in the table are not loaded and are unavailable. See [Section 5.7.1, “Installing and Uninstalling Loadable Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function-loading).

**Note**

Like the **mysql.func** system table, the Performance Schema [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table lists loadable functions installed using [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable). Unlike the **mysql.func** table, the [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table also lists functions installed automatically by server components or plugins. This difference makes [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) preferable to **mysql.func** for checking which functions are installed. See [Section 27.12.21.8, “The user\_defined\_functions Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table).

* **plugin**: The registry for server-side plugins installed using [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin). During the normal startup sequence, the server loads plugins registered in this table. If the server is started with the [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) option, plugins registered in the table are not loaded and are unavailable. See [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).

### Log System Tables

The server uses these system tables for logging:

* **general\_log**: The general query log table.
* **slow\_log**: The slow query log table.

Log tables use the **CSV** storage engine.

For more information, see [Section 5.4, “MySQL Server Logs”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-logs).

### Server-Side Help System Tables

These system tables contain server-side help information:

* **help\_category**: Information about help categories.
* **help\_keyword**: Keywords associated with help topics.
* **help\_relation**: Mappings between help keywords and topics.
* **help\_topic**: Help topic contents.

For more information, see [Section 5.1.17, “Server-Side Help Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-side-help-support).

### Time Zone System Tables

These system tables contain time zone information:

* **time\_zone**: Time zone IDs and whether they use leap seconds.
* **time\_zone\_leap\_second**: When leap seconds occur.
* **time\_zone\_name**: Mappings between time zone IDs and names.
* **time\_zone\_transition**, **time\_zone\_transition\_type**: Time zone descriptions.

For more information, see [Section 5.1.15, “MySQL Server Time Zone Support”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#time-zone-support).

### Replication System Tables

The server uses these system tables to support replication:

* **gtid\_executed**: Table for storing GTID values. See [mysql.gtid\_executed Table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-gtids-gtid-executed-table).
* **ndb\_binlog\_index**: Binary log information for NDB Cluster replication. This table is created only if the server is built with [**NDBCLUSTER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html) support. See [Section 23.6.4, “NDB Cluster Replication Schema and Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html#mysql-cluster-replication-schema).
* **slave\_master\_info**, **slave\_relay\_log\_info**, **slave\_worker\_info**: Used to store replication information on replica servers. See [Section 17.2.4, “Relay Log and Replication Metadata Repositories”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replica-logs).

All of the tables just listed use the [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html) storage engine.

### Optimizer System Tables

These system tables are for use by the optimizer:

* **innodb\_index\_stats**, **innodb\_table\_stats**: Used for **InnoDB** persistent optimizer statistics. See [Section 15.8.10.1, “Configuring Persistent Optimizer Statistics Parameters”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-persistent-stats).
* **server\_cost**, **engine\_cost**: The optimizer cost model uses tables that contain cost estimate information about operations that occur during query execution. **server\_cost** contains optimizer cost estimates for general server operations. **engine\_cost** contains estimates for operations specific to particular storage engines. See [Section 8.9.5, “The Optimizer Cost Model”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#cost-model).

### Miscellaneous System Tables

Other system tables do not fit the preceding categories:

* **audit\_log\_filter**, **audit\_log\_user**: If MySQL Enterprise Audit is installed, these tables provide persistent storage of audit log filter definitions and user accounts. See [Audit Log Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#audit-log-tables).
* **firewall\_group\_allowlist**, **firewall\_groups**, **firewall\_memebership**, **firewall\_users**, **firewall\_whitelist**: If MySQL Enterprise Firewall is installed, these tables provide persistent storage for information used by the firewall. See [Section 6.4.7, “MySQL Enterprise Firewall”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#firewall).
* **servers**: Used by the **FEDERATED** storage engine. See [Section 16.8.2.2, “Creating a FEDERATED Table Using CREATE SERVER”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#federated-create-server).
* **innodb\_dynamic\_metadata**: Used by the **InnoDB** storage engine to store fast-changing table metadata such as auto-increment counter values and index tree corruption flags. Replaces the data dictionary buffer table that resided in the **InnoDB** system tablespace.

## 5.4 MySQL服务器日志

5.4.1 选择一般查询日志和慢速查询日志的输出目的地

5.4.2 错误日志

5.4.3 一般查询日志

5.4.4 二进制日志

5.4.5 慢速查询日志

5.4.6 服务器日志维护

MySQL服务器有几个日志，可以帮助你找出正在发生的活动。

| **Log Type** | **Information Written to Log** |
| --- | --- |
| Error log | Problems encountered starting, running, or stopping [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) |
| General query log | Established client connections and statements received from clients |
| Binary log | Statements that change data (also used for replication) |
| Relay log | Data changes received from a replication source server |
| Slow query log | Queries that took more than [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) seconds to execute |
| DDL log (metadata log) | Metadata operations performed by DDL statements |

By default, no logs are enabled, except the error log on Windows. (The DDL log is always created when required, and has no user-configurable options; see [The DDL Log](https://dev.mysql.com/doc/refman/5.7/en/ddl-log.html).) The following log-specific sections provide information about the server options that enable logging.

By default, the server writes files for all enabled logs in the data directory. You can force the server to close and reopen the log files (or in some cases switch to a new log file) by flushing the logs. Log flushing occurs when you issue a [**FLUSH LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-logs) statement; execute [**mysqladmin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) with a **flush-logs** or **refresh** argument; or execute [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) with a [--flush-logs](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqldump_flush-logs) or [--master-data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqldump_master-data) option. See [Section 13.7.8.3, “FLUSH Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush), [Section 4.5.2, “mysqladmin — A MySQL Server Administration Program”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin), and [Section 4.5.4, “mysqldump — A Database Backup Program”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump). In addition, the binary log is flushed when its size reaches the value of the [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size) system variable.

You can control the general query and slow query logs during runtime. You can enable or disable logging, or change the log file name. You can tell the server to write general query and slow query entries to log tables, log files, or both. For details, see [Section 5.4.1, “Selecting General Query Log and Slow Query Log Output Destinations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations), [Section 5.4.3, “The General Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#query-log), and [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log).

The relay log is used only on replicas, to hold data changes from the replication source server that must also be made on the replica. For discussion of relay log contents and configuration, see [Section 17.2.4.1, “The Relay Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replica-logs-relaylog).

For information about log maintenance operations such as expiration of old log files, see [Section 5.4.6, “Server Log Maintenance”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-file-maintenance).

For information about keeping logs secure, see [Section 6.1.2.3, “Passwords and Logging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-logging).

### 5.4.1 Selecting General Query Log and Slow Query Log Output Destinations

MySQL Server provides flexible control over the destination of output written to the general query log and the slow query log, if those logs are enabled. Possible destinations for log entries are log files or the **general\_log** and **slow\_log** tables in the **mysql** system database. File output, table output, or both can be selected.

* [Log Control at Server Startup](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations-startup)
* [Log Control at Runtime](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations-runtime)
* [Log Table Benefits and Characteristics](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations-tables)

#### Log Control at Server Startup

The [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable specifies the destination for log output. Setting this variable does not in itself enable the logs; they must be enabled separately.

* If [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) is not specified at startup, the default logging destination is **FILE**.
* If [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) is specified at startup, its value is a list one or more comma-separated words chosen from **TABLE** (log to tables), **FILE** (log to files), or **NONE** (do not log to tables or files). **NONE**, if present, takes precedence over any other specifiers.

The [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) system variable controls logging to the general query log for the selected log destinations. If specified at server startup, [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) takes an optional argument of 1 or 0 to enable or disable the log. To specify a file name other than the default for file logging, set the [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) variable. Similarly, the [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) variable controls logging to the slow query log for the selected destinations and setting [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) specifies a file name for file logging. If either log is enabled, the server opens the corresponding log file and writes startup messages to it. However, further logging of queries to the file does not occur unless the **FILE** log destination is selected.

Examples:

* To write general query log entries to the log table and the log file, use [--log\_output=TABLE,FILE](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) to select both log destinations and [--general\_log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) to enable the general query log.
* To write general and slow query log entries only to the log tables, use [--log\_output=TABLE](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) to select tables as the log destination and [--general\_log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) and [--slow\_query\_log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) to enable both logs.
* To write slow query log entries only to the log file, use [--log\_output=FILE](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) to select files as the log destination and [--slow\_query\_log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) to enable the slow query log. In this case, because the default log destination is **FILE**, you could omit the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) setting.

#### Log Control at Runtime

The system variables associated with log tables and files enable runtime control over logging:

* The [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) variable indicates the current logging destination. It can be modified at runtime to change the destination.
* The [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) and [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) variables indicate whether the general query log and slow query log are enabled (**ON**) or disabled (**OFF**). You can set these variables at runtime to control whether the logs are enabled.
* The [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) and [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) variables indicate the names of the general query log and slow query log files. You can set these variables at server startup or at runtime to change the names of the log files.
* To disable or enable general query logging for the current session, set the session [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) variable to **ON** or **OFF**. (This assumes that the general query log itself is enabled.)

#### Log Table Benefits and Characteristics

The use of tables for log output offers the following benefits:

* Log entries have a standard format. To display the current structure of the log tables, use these statements:
* SHOW CREATE TABLE mysql.general\_log;
* SHOW CREATE TABLE mysql.slow\_log;
* Log contents are accessible through SQL statements. This enables the use of queries that select only those log entries that satisfy specific criteria. For example, to select log contents associated with a particular client (which can be useful for identifying problematic queries from that client), it is easier to do this using a log table than a log file.
* Logs are accessible remotely through any client that can connect to the server and issue queries (if the client has the appropriate log table privileges). It is not necessary to log in to the server host and directly access the file system.

The log table implementation has the following characteristics:

* In general, the primary purpose of log tables is to provide an interface for users to observe the runtime execution of the server, not to interfere with its runtime execution.
* [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table), [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), and [**DROP TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-table) are valid operations on a log table. For [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) and [**DROP TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-table), the log table cannot be in use and must be disabled, as described later.
* By default, the log tables use the **CSV** storage engine that writes data in comma-separated values format. For users who have access to the .CSV files that contain log table data, the files are easy to import into other programs such as spreadsheets that can process CSV input.

The log tables can be altered to use the **MyISAM** storage engine. You cannot use [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table) to alter a log table that is in use. The log must be disabled first. No engines other than **CSV** or **MyISAM** are legal for the log tables.

**Log Tables and “Too many open files” Errors.** If you select **TABLE** as a log destination and the log tables use the **CSV** storage engine, you may find that disabling and enabling the general query log or slow query log repeatedly at runtime results in a number of open file descriptors for the .CSV file, possibly resulting in a “Too many open files” error. To work around this issue, execute [**FLUSH TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush) or ensure that the value of [**open\_files\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_open_files_limit) is greater than the value of [**table\_open\_cache\_instances**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_table_open_cache_instances).

* To disable logging so that you can alter (or drop) a log table, you can use the following strategy. The example uses the general query log; the procedure for the slow query log is similar but uses the **slow\_log** table and [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) system variable.
* SET @old\_log\_state = @@GLOBAL.general\_log;
* SET GLOBAL general\_log = 'OFF';
* ALTER TABLE mysql.general\_log ENGINE = MyISAM;
* SET GLOBAL general\_log = @old\_log\_state;
* [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table) is a valid operation on a log table. It can be used to expire log entries.
* [**RENAME TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#rename-table) is a valid operation on a log table. You can atomically rename a log table (to perform log rotation, for example) using the following strategy:
* USE mysql;
* DROP TABLE IF EXISTS general\_log2;
* CREATE TABLE general\_log2 LIKE general\_log;
* RENAME TABLE general\_log TO general\_log\_backup, general\_log2 TO general\_log;
* [**CHECK TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#check-table) is a valid operation on a log table.
* [**LOCK TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#lock-tables) cannot be used on a log table.
* [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete), and [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) cannot be used on a log table. These operations are permitted only internally to the server itself.
* [**FLUSH TABLES WITH READ LOCK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables-with-read-lock) and the state of the [**read\_only**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_read_only) system variable have no effect on log tables. The server can always write to the log tables.
* Entries written to the log tables are not written to the binary log and thus are not replicated to replicas.
* To flush the log tables or log files, use [**FLUSH TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-tables) or [**FLUSH LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-logs), respectively.
* Partitioning of log tables is not permitted.
* A [**mysqldump**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) dump includes statements to recreate those tables so that they are not missing after reloading the dump file. Log table contents are not dumped.

### 5.4.2 The Error Log

[5.4.2.1 Error Log Configuration](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration)

[5.4.2.2 Default Error Log Destination Configuration](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-destination-configuration)

[5.4.2.3 Error Event Fields](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-event-fields)

[5.4.2.4 Types of Error Log Filtering](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-filtering)

[5.4.2.5 Priority-Based Error Log Filtering (log\_filter\_internal)](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-priority-based-filtering)

[5.4.2.6 Rule-Based Error Log Filtering (log\_filter\_dragnet)](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-rule-based-filtering)

[5.4.2.7 Error Logging in JSON Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-json)

[5.4.2.8 Error Logging to the System Log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog)

[5.4.2.9 Error Log Output Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format)

[5.4.2.10 Error Log File Flushing and Renaming](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-rotation)

This section discusses how to configure the MySQL server for logging of diagnostic messages to the error log. For information about selecting the error message character set and language, see [Section 10.6, “Error Message Character Set”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-errors), and [Section 10.12, “Setting the Error Message Language”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#error-message-language).

The error log contains a record of [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) startup and shutdown times. It also contains diagnostic messages such as errors, warnings, and notes that occur during server startup and shutdown, and while the server is running. For example, if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) notices that a table needs to be automatically checked or repaired, it writes a message to the error log.

Depending on error log configuration, error messages may also populate the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table, to provide an SQL interface to the log and enable its contents to be queried. See [Section 27.12.21.1, “The error\_log Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table).

On some operating systems, the error log contains a stack trace if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) exits abnormally. The trace can be used to determine where [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) exited. See [Section 5.9, “Debugging MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#debugging-mysql).

If used to start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) may write messages to the error log. For example, when [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) notices abnormal [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) exits, it restarts [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) and writes a **mysqld restarted** message to the error log.

The following sections discuss aspects of configuring error logging.

#### 5.4.2.1 Error Log Configuration

In MySQL 8.0, error logging uses the MySQL component architecture described at [Section 5.5, “MySQL Components”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#components). The error log subsystem consists of components that perform log event filtering and writing, as well as a system variable that configures which components to enable to achieve the desired logging result.

This section discusses how to select components for error logging. For instructions specific to log filters, see [Section 5.4.2.4, “Types of Error Log Filtering”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-filtering). For instructions specific to the JSON and system log sinks, see [Section 5.4.2.7, “Error Logging in JSON Format”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-json), and [Section 5.4.2.8, “Error Logging to the System Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog). For additional details about all available log components, see [Section 5.5.3, “Error Log Components”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-components).

Component-based error logging offers these features:

* Log events can be filtered by filter components to affect the information available for writing.
* Log events are output by sink (writer) components. Multiple sink components can be enabled, to write error log output to multiple destinations.
* Built-in filter and sink components combine to implement the default error log format.
* A loadable sink enables logging in JSON format.
* A loadable sink enables logging to the system log.
* System variables control which log components to enable and how each component operates.

The [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) system variable controls which log components to enable for error logging. The variable may contain a list with 0, 1, or many elements. In the latter case, elements may be delimited by semicolon or (as of MySQL 8.0.12) comma, optionally followed by space. A given setting cannot use both semicolon and comma separators. Component order is significant because the server executes components in the order listed.

By default, [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) has this value:

mysql> **SELECT @@GLOBAL.log\_error\_services;**

+----------------------------------------+

| @@GLOBAL.log\_error\_services |

+----------------------------------------+

| log\_filter\_internal; log\_sink\_internal |

+----------------------------------------+

That value indicates that log events first pass through the **log\_filter\_internal** filter component, then through the **log\_sink\_internal** sink component, both of which are built in. A filter modifies log events seen by components named later in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value. A sink is a destination for log events. Typically, a sink processes log events into log messages that have a particular format and writes these messages to its associated output, such as a file or the system log.

**Note**

The final component in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value cannot be a filter. This is an error because any changes it has on events would have no effect on output:

mysql> **SET GLOBAL log\_error\_services = 'log\_filter\_internal';**

ERROR 1231 (42000): Variable 'log\_error\_services' can't be set to the value

of 'log\_filter\_internal'

To correct the problem, include a sink at the end of the value:

mysql> **SET GLOBAL log\_error\_services = 'log\_filter\_internal; log\_sink\_internal';**

Query OK, 0 rows affected (0.00 sec)

The combination of **log\_filter\_internal** and **log\_sink\_internal** implements the default error log filtering and output behavior. The action of these components is affected by other server options and system variables:

* The output destination is determined by the [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) option (and, on Windows, [--pid-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file) and [--console](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console)). These determine whether to write error messages to the console or a file and, if to a file, the error log file name. See [Section 5.4.2.2, “Default Error Log Destination Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-destination-configuration).
* The [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) system variables affect which types of log events **log\_filter\_internal** permits or suppresses. See [Section 5.4.2.5, “Priority-Based Error Log Filtering (log\_filter\_internal)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-priority-based-filtering).

To change the set of log components used for error logging, load components as necessary, perform any component-specific configuration, and modify the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value. Adding or removing log components is subject to these constraints:

* To add a log component to the list of enabled components:
  + Load the component using [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) (unless it is built in or already loaded).
  + If the component exposes any system variables that must be set for component initialization to succeed, assign those variables appropriate values.
  + Enable the component by listing it in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value.
* For a component to be permitted in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value, it must be known. A component is known if it is built in, or if it is loadable and has been loaded using [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component). Attempts to name an unknown component at server startup cause [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) to be set to its default value. Attempts to name an unknown component at runtime produce an error and the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value remains unchanged.
* To disable a log component, remove it from the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value. Then, if the component is loadable and you also want to unload it, use [**UNINSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-component).

Attempts to use [**UNINSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-component) to unload a loadable component that is still named in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value produce an error.

For example, to use the system log sink (**log\_sink\_syseventlog**) instead of the default sink (**log\_sink\_internal**), first load the sink component, then modify the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value:

INSTALL COMPONENT 'file://component\_log\_sink\_syseventlog';

SET GLOBAL log\_error\_services = 'log\_filter\_internal; log\_sink\_syseventlog';

**Note**

The URN to use for loading a log component with [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) is the component name prefixed with **file://component\_**. For example, for the **log\_sink\_syseventlog** component, the corresponding URN is **file://component\_log\_sink\_syseventlog**.

It is possible to configure multiple log sinks, which enables sending output to multiple destinations. To enable the system log sink in addition to (rather than instead of) the default sink, set the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value like this:

SET GLOBAL log\_error\_services = 'log\_filter\_internal; log\_sink\_internal; log\_sink\_syseventlog';

To revert to using only the default sink and unload the system log sink, execute these statements:

SET GLOBAL log\_error\_services = 'log\_filter\_internal; log\_sink\_internal;

UNINSTALL COMPONENT 'file://component\_log\_sink\_syseventlog';

To configure a log component to be enabled at each server startup, use this procedure:

1. If the component is loadable, load it at runtime using [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component). Loading the component registers it in the **mysql.component** system table so that the server loads it automatically for subsequent startups.
2. Set the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value at startup to include the component name. Set the value either in the server my.cnf file, or use [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable), which sets the value for the running MySQL instance and also saves the value to be used for subsequent server restarts; see [Section 13.7.6.1, “SET Syntax for Variable Assignment”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable). A value set in my.cnf takes effect at the next restart. A value set using [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) takes effect immediately, and for subsequent restarts.

Suppose that you want to configure, for every server startup, use of the JSON log sink (**log\_sink\_json**) in addition to the built-in log filter and sink (**log\_filter\_internal**, **log\_sink\_internal**). First load the JSON sink if it is not loaded:

INSTALL COMPONENT 'file://component\_log\_sink\_json';

Then set [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) to take effect at server startup. You can set it in my.cnf:

[mysqld]

log\_error\_services='log\_filter\_internal; log\_sink\_internal; log\_sink\_json'

Or you can set it using [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable):

SET PERSIST log\_error\_services = 'log\_filter\_internal; log\_sink\_internal; log\_sink\_json';

The order of components named in [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) is significant, particularly with respect to the relative order of filters and sinks. Consider this [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value:

log\_filter\_internal; log\_sink\_1; log\_sink\_2

In this case, log events pass to the built-in filter, then to the first sink, then to the second sink. Both sinks receive the filtered log events.

Compare that to this [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value:

log\_sink\_1; log\_filter\_internal; log\_sink\_2

In this case, log events pass to the first sink, then to the built-in filter, then to the second sink. The first sink receives unfiltered events. The second sink receives filtered events. You might configure error logging this way if you want one log that contains messages for all log events, and another log that contains messages only for a subset of log events.

**Note**

If the enabled log components include a sink that provides Performance Schema support, events written to the error log are also written to the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table. This enables examining error log contents using SQL queries. Currently, the traditional-format **log\_sink\_internal** and JSON-format **log\_sink\_json** sinks support this capability. See [Section 27.12.21.1, “The error\_log Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table).

#### 5.4.2.2 Default Error Log Destination Configuration

This section describes which server options configure the default error log destination, which can be the console or a named file. It also indicates which log sink components base their own output destination on the default destination.

In this discussion, “console” means **stderr**, the standard error output. This is your terminal or console window unless the standard error output has been redirected to a different destination.

The server interprets options that determine the default error log destination somewhat differently for Windows and Unix systems. Be sure to configure the destination using the information appropriate to your platform. After the server interprets the default error log destination options, it sets the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable to indicate the default destination, which affects where several log sink components write error messages. The following sections address these topics.

* [Default Error Log Destination on Windows](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-destination-configuration-windows)
* [Default Error Log Destination on Unix and Unix-Like Systems](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-destination-configuration-unix)
* [How the Default Error Log Destination Affects Log Sinks](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-destination-sink-effects)

##### Default Error Log Destination on Windows

On Windows, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) uses the [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error), [--pid-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file), and [--console](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console) options to determine whether the default error log destination is the console or a file, and, if a file, the file name:

* If [--console](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console) is given, the default destination is the console. ([--console](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_console) takes precedence over [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) if both are given, and the following items regarding [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) do not apply.)
* If [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) is not given, or is given without naming a file, the default destination is a file named ***host\_name***.err in the data directory, unless the [--pid-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pid_file) option is specified. In that case, the file name is the PID file base name with a suffix of .err in the data directory.
* If [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) is given to name a file, the default destination is that file (with an .err suffix added if the name has no suffix). The file location is under the data directory unless an absolute path name is given to specify a different location.

If the default error log destination is the console, the server sets the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable to **stderr**. Otherwise, the default destination is a file and the server sets [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) to the file name.

##### Default Error Log Destination on Unix and Unix-Like Systems

On Unix and Unix-like systems, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) uses the [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) option to determine whether the default error log destination is the console or a file, and, if a file, the file name:

* If [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) is not given, the default destination is the console.
* If [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) is given without naming a file, the default destination is a file named ***host\_name***.err in the data directory.
* If [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) is given to name a file, the default destination is that file (with an .err suffix added if the name has no suffix). The file location is under the data directory unless an absolute path name is given to specify a different location.
* If [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) is given in an option file in a **[mysqld]**, **[server]**, or **[mysqld\_safe]** section, on systems that use [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) to start the server, [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) finds and uses the option, and passes it to [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).

**Note**

It is common for Yum or APT package installations to configure an error log file location under /var/log with an option like **log-error=/var/log/mysqld.log** in a server configuration file. Removing the path name from the option causes the ***host\_name***.err file in the data directory to be used.

If the default error log destination is the console, the server sets the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable to **stderr**. Otherwise, the default destination is a file and the server sets [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) to the file name.

##### How the Default Error Log Destination Affects Log Sinks

After the server interprets the error log destination configuration options, it sets the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable to indicate the default error log destination. Log sink components may base their own output destination on the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) value, or determine their destination independently of [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error)

If [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) is **stderr**, the default error log destination is the console, and log sinks that base their output destination on the default destination also write to the console:

* **log\_sink\_internal**, **log\_sink\_json**, **log\_sink\_test**: These sinks write to the console. This is true even for sinks such as **log\_sink\_json** that can be enabled multiple times; all instances write to the console.
* **log\_sink\_syseventlog**: This sink writes to the system log, regardless of the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) value.

If [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) is not **stderr**, the default error log destination is a file and [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) indicates the file name. Log sinks that base their output destination on the default destination base output file naming on that file name. (A sink might use exactly that name, or it might use some variant thereof.) Suppose that the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) value ***file\_name***. Then log sinks use the name like this:

* **log\_sink\_internal**, **log\_sink\_test**: These sinks write to ***file\_name***.
* **log\_sink\_json**: Successive instances of this sink named in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value write to files named ***file\_name*** plus a numbered .***NN***.json suffix: ***file\_name***.00.json, ***file\_name***.01.json, and so forth.
* **log\_sink\_syseventlog**: This sink writes to the system log, regardless of the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) value.

#### 5.4.2.3 Error Event Fields

Error events intended for the error log contain a set of fields, each of which consists of a key/value pair. An event field may be classified as core, optional, or user-defined:

* A core field is set up automatically for error events. However, its presence in the event during event processing is not guaranteed because a core field, like any type of field, may be unset by a log filter. If this happens, the field cannot be found by subsequent processing within that filter and by components that execute after the filter (such as log sinks).
* An optional field is normally absent but may be present for certain event types. When present, an optional field provides additional event information as appropriate and available.
* A user-defined field is any field with a name that is not already defined as a core or optional field. A user-defined field does not exist until created by a log filter.

As implied by the preceding description, any given field may be absent during event processing, either because it was not present in the first place, or was discarded by a filter. For log sinks, the effect of field absence is sink specific. For example, a sink might omit the field from the log message, indicate that the field is missing, or substitute a default. When in doubt, test: use a filter that unsets the field, then check what the log sink does with it.

The following sections describe the core and optional error event fields. For individual log filter components, there may be additional filter-specific considerations for these fields, or filters may add user-defined fields not listed here. For details, see the documentation for specific filters.

* [Core Error Event Fields](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-event-core-fields)
* [Optional Error Event Fields](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-event-optional-fields)

##### Core Error Event Fields

These error event fields are core fields:

* **time**

The event timestamp, with microsecond precision.

* **msg**

The event message string.

* **prio**

The event priority, to indicate a system, error, warning, or note/information event. This field corresponds to severity in **syslog**. The following table shows the possible priority levels.

| **Event Type** | **Numeric Priority** |
| --- | --- |
| System event | 0 |
| Error event | 1 |
| Warning event | 2 |
| Note/information event | 3 |

The **prio** value is numeric. Related to it, an error event may also include an optional **label** field representing the priority as a string. For example, an event with a **prio** value of 2 may have a **label** value of **'Warning'**.

Filter components may include or drop error events based on priority, except that system events are mandatory and cannot be dropped.

In general, message priorities are determined as follows:

Is the situation or event actionable?

* + Yes: Is the situation or event ignorable?
    - Yes: Priority is warning.
    - No: Priority is error.
  + No: Is the situation or event mandatory?
    - Yes: Priority is system.
    - No: Priority is note/information.
* **err\_code**

The event error code, as a number (for example, **1022**).

* **err\_symbol**

The event error symbol, as a string (for example, [**'ER\_DUP\_KEY'**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_dup_key)).

* **SQL\_state**

The event SQLSTATE value, as a string (for example, **'23000'**).

* **subsystem**

The subsystem in which the event occurred. Possible values are **InnoDB** (the **InnoDB** storage engine), **Repl** (the replication subsystem), **Server** (otherwise).

##### Optional Error Event Fields

Optional error event fields fall into the following categories:

* Additional information about the error, such as the error signaled by the operating system or the error lable:
  + **OS\_errno**

The operating system error number.

* + **OS\_errmsg**

The operating system error message.

* + **label**

The label corresponding to the **prio** value, as a string.

* Identification of the client for which the event occurred:
  + **user**

The client user.

* + **host**

The client host.

* + **thread**

The ID of the thread within [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) responsible for producing the error event. This ID indicates which part of the server produced the event, and is consistent with general query log and slow query log messages, which include the connection thread ID.

* + **query\_id**

The query ID.

* Debugging information:
  + **source\_file**

The source file in which the event occurred, without any leading path.

* + **source\_line**

The line within the source file at which the event occurred.

* + **function**

The function in which the event occurred.

* + **component**

The component or plugin in which the event occurred.

#### 5.4.2.4 Types of Error Log Filtering

Error log configuration normally includes one log filter component and one or more log sink components. For error log filtering, MySQL offers a choice of components:

* **log\_filter\_internal**: This filter component provides error log filtering based on log event priority and error code, in combination with the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) system variables. **log\_filter\_internal** is built in and enabled by default. See [Section 5.4.2.5, “Priority-Based Error Log Filtering (log\_filter\_internal)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-priority-based-filtering).
* **log\_filter\_dragnet**: This filter component provides error log filtering based on user-supplied rules, in combination with the [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) system variable. See [Section 5.4.2.6, “Rule-Based Error Log Filtering (log\_filter\_dragnet)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-rule-based-filtering).

#### 5.4.2.5 Priority-Based Error Log Filtering (log\_filter\_internal)

The **log\_filter\_internal** log filter component implements a simple form of log filtering based on error event priority and error code. To affect how **log\_filter\_internal** permits or suppresses error, warning, and information events intended for the error log, set the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) system variables.

**log\_filter\_internal** is built in and enabled by default. If this filter is disabled, [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) have no effect, so filtering must be performed using another filter service instead where desired (for example, with individual filter rules when using **log\_filter\_dragnet**). For information about filter configuration, see [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration).

* [Verbosity Filtering](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-verbosity-filtering)
* [Suppression-List Filtering](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-suppression-filtering)
* [Verbosity and Suppression-List Interaction](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-verbosity-suppression-interaction)

##### Verbosity Filtering

Events intended for the error log have a priority of **ERROR**, **WARNING**, or **INFORMATION**. The [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) system variable controls verbosity based on which priorities to permit for messages written to the log, as shown in the following table.

| **log\_error\_verbosity Value** | **Permitted Message Priorities** |
| --- | --- |
| 1 | **ERROR** |
| 2 | **ERROR**, **WARNING** |
| 3 | **ERROR**, **WARNING**, **INFORMATION** |

If [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) is 2 or greater, the server logs messages about statements that are unsafe for statement-based logging. If the value is 3, the server logs aborted connections and access-denied errors for new connection attempts. See [Section B.3.2.9, “Communication Errors and Aborted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#communication-errors).

If you use replication, a [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value of 2 or greater is recommended, to obtain more information about what is happening, such as messages about network failures and reconnections.

If [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) is 2 or greater on a replica, the replica prints messages to the error log to provide information about its status, such as the binary log and relay log coordinates where it starts its job, when it is switching to another relay log, when it reconnects after a disconnect, and so forth.

There is also a message priority of **SYSTEM** that is not subject to verbosity filtering. System messages about non-error situations are printed to the error log regardless of the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value. These messages include startup and shutdown messages, and some significant changes to settings.

In the MySQL error log, system messages are labeled as “System”. Other log sinks might or might not follow the same convention, and in the resulting logs, system messages might be assigned the label used for the information priority level, such as “Note” or “Information”. If you apply any additional filtering or redirection for logging based on the labeling of messages, system messages do not override your filter, but are handled by it in the same way as other messages.

##### Suppression-List Filtering

The [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) system variable applies to events intended for the error log and specifies which events to suppress when they occur with a priority of **WARNING** or **INFORMATION**. For example, if a particular type of warning is considered undesirable “noise” in the error log because it occurs frequently but is not of interest, it can be suppressed. [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) does not suppress messages with a priority of **ERROR** or **SYSTEM**.

The [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) value may be the empty string for no suppression, or a list of one or more comma-separated values indicating the error codes to suppress. Error codes may be specified in symbolic or numeric form. A numeric code may be specified with or without the **MY-** prefix. Leading zeros in the numeric part are not significant. Examples of permitted code formats:

ER\_SERVER\_SHUTDOWN\_COMPLETE

MY-000031

000031

MY-31

31

For readability and portability, symbolic values are preferable to numeric values.

Although codes to be suppressed can be expressed in symbolic or numeric form, the numeric value of each code must be in a permitted range:

* 1 to 999: Global error codes that are used by the server as well as by clients.
* 10000 and higher: Server error codes intended to be written to the error log (not sent to clients).

In addition, each error code specified must actually be used by MySQL. Attempts to specify a code not within a permitted range or within a permitted range but not used by MySQL produce an error and the [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) value remains unchanged.

For information about error code ranges and the error symbols and numbers defined within each range, see [Section B.1, “Error Message Sources and Elements”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#error-message-elements), and [MySQL 8.0 Error Message Reference](https://dev.mysql.com/doc/mysql-errors/8.0/en/).

The server can generate messages for a given error code at differing priorities, so suppression of a message associated with an error code listed in [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) depends on its priority. Suppose that the variable has a value of **'ER\_PARSER\_TRACE,MY-010001,10002'**. Then [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) has these effects on messages for those codes:

* Messages generated with a priority of **WARNING** or **INFORMATION** are suppressed.
* Messages generated with a priority of **ERROR** or **SYSTEM** are not suppressed.

##### Verbosity and Suppression-List Interaction

The effect of [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) combines with that of [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list). Consider a server started with these settings:

[mysqld]

log\_error\_verbosity=2 # error and warning messages only

log\_error\_suppression\_list='ER\_PARSER\_TRACE,MY-010001,10002'

In this case, [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) permits messages with **ERROR** or **WARNING** priority and discards messages with **INFORMATION** priority. Of the nondiscarded messages, [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) discards messages with **WARNING** priority and any of the named error codes.

**Note**

The [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value of 2 shown in the example is also its default value, so the effect of this variable on **INFORMATION** messages is as just described by default, without an explicit setting. You must set [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) to 3 if you want [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) to affect messages with **INFORMATION** priority.

Consider a server started with this setting:

[mysqld]

log\_error\_verbosity=1 # error messages only

In this case, [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) permits messages with **ERROR** priority and discards messages with **WARNING** or **INFORMATION** priority. Setting [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) has no effect because all error codes it might suppress are already discarded due to the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) setting.

#### 5.4.2.6 Rule-Based Error Log Filtering (log\_filter\_dragnet)

The **log\_filter\_dragnet** log filter component enables log filtering based on user-defined rules.

To enable the **log\_filter\_dragnet** filter, first load the filter component, then modify the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value. The following example enables **log\_filter\_dragnet** in combination with the built-in log sink:

INSTALL COMPONENT 'file://component\_log\_filter\_dragnet';

SET GLOBAL log\_error\_services = 'log\_filter\_dragnet; log\_sink\_internal';

To set [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) to take effect at server startup, use the instructions at [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration). Those instructions apply to other error-logging system variables as well.

With **log\_filter\_dragnet** enabled, define its filter rules by setting the [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) system variable. A rule set consists of zero or more rules, where each rule is an **IF** statement terminated by a period (**.**) character. If the variable value is empty (zero rules), no filtering occurs.

Example 1. This rule set drops information events, and, for other events, removes the **source\_line** field:

SET GLOBAL dragnet.log\_error\_filter\_rules =

'IF prio>=INFORMATION THEN drop. IF EXISTS source\_line THEN unset source\_line.';

The effect is similar to the filtering performed by the **log\_sink\_internal** filter with a setting of [**log\_error\_verbosity=2**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity).

For readability, you might find it preferable to list the rules on separate lines. For example:

SET GLOBAL dragnet.log\_error\_filter\_rules = '

IF prio>=INFORMATION THEN drop.

IF EXISTS source\_line THEN unset source\_line.

';

Example 2: This rule limits information events to no more than one per 60 seconds:

SET GLOBAL dragnet.log\_error\_filter\_rules =

'IF prio>=INFORMATION THEN throttle 1/60.';

Once you have the filtering configuration set up as you desire, consider assigning [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) using [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) rather than [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) to make the setting persist across server restarts. Alternatively, add the setting to the server option file.

To stop using the filtering language, first remove it from the set of error logging components. Usually this means using a different filter component rather than no filter component. For example:

SET GLOBAL log\_error\_services = 'log\_filter\_internal; log\_sink\_internal';

Again, consider using using [**SET PERSIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) rather than [**SET GLOBAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) to make the setting persist across server restarts.

Then uninstall the filter **log\_filter\_dragnet** component:

UNINSTALL COMPONENT 'file://component\_log\_filter\_dragnet';

The following sections describe aspects of **log\_filter\_dragnet** operation in more detail:

* [Grammar for log\_filter\_dragnet Rule Language](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-filtering-language)
* [Actions for log\_filter\_dragnet Rules](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-filtering-actions)
* [Field References in log\_filter\_dragnet Rules](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-filtering-fields)

##### Grammar for log\_filter\_dragnet Rule Language

The following grammar defines the language for **log\_filter\_dragnet** filter rules. Each rule is an **IF** statement terminated by a period (**.**) character. The language is not case-sensitive.

***rule***:

IF ***condition*** THEN ***action***

[ELSEIF ***condition*** THEN ***action***] ...

[ELSE ***action***]

.

***condition***: {

***field*** ***comparator*** ***value***

| [NOT] EXISTS ***field***

| ***condition*** {AND | OR} ***condition***

}

***action***: {

drop

| throttle {***count*** | ***count*** / ***window\_size***}

| set ***field*** [:= | =] ***value***

| unset [***field***]

}

***field***: {

***core\_field***

| ***optional\_field***

| ***user\_defined\_field***

}

***core\_field***: {

time

| msg

| prio

| err\_code

| err\_symbol

| SQL\_state

| subsystem

}

***optional\_field***: {

OS\_errno

| OS\_errmsg

| label

| user

| host

| thread

| query\_id

| source\_file

| source\_line

| function

| component

}

***user\_defined\_field***:

***sequence of characters in [a-zA-Z0-9\_] class***

***comparator***: {== | != | <> | >= | => | <= | =< | < | >}

***value***: {

***string\_literal***

| ***integer\_literal***

| ***float\_literal***

| ***error\_symbol***

| ***priority***

}

***count***: ***integer\_literal***

***window\_size***: ***integer\_literal***

***string\_literal***:

***sequence of characters quoted as '...' or "..."***

***integer\_literal***:

***sequence of characters in [0-9] class***

***float\_literal***:

***integer\_literal***[.***integer\_literal***]

***error\_symbol***:

***valid MySQL error symbol such as ER\_ACCESS\_DENIED\_ERROR or ER\_STARTUP***

***priority***: {

ERROR

| WARNING

| INFORMATION

}

Simple conditions compare a field to a value or test field existence. To construct more complex conditions, use the **AND** and **OR** operators. Both operators have the same precedence and evaluate left to right.

To escape a character within a string, precede it by a backslash (**\**). A backslash is required to include backslash itself or the string-quoting character, optional for other characters.

For convenience, **log\_filter\_dragnet** supports symbolic names for comparisons to certain fields. For readability and portability, symbolic values are preferable (where applicable) to numeric values.

* Event priority values 1, 2, and 3 can be specified as **ERROR**, **WARNING**, and **INFORMATION**. Priority symbols are recognized only in comparisons with the **prio** field. These comparisons are equivalent:
* IF prio == INFORMATION THEN ...
* IF prio == 3 THEN ...
* Error codes can be specified in numeric form or as the corresponding error symbol. For example, [**ER\_STARTUP**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_startup) is the symbolic name for error **1408**, so these comparisons are equivalent:
* IF err\_code == ER\_STARTUP THEN ...
* IF err\_code == 1408 THEN ...

Error symbols are recognized only in comparisons with the **err\_code** field and user-defined fields.

To find the error symbol corresponding to a given error code number, use one of these methods:

* + Check the list of server errors at [Server Error Message Reference](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html).
  + Use the [**perror**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#perror) command. Given an error number argument, [**perror**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#perror) displays information about the error, including its symbol.

Suppose that a rule set with error numbers looks like this:

IF err\_code == 10927 OR err\_code == 10914 THEN drop.

IF err\_code == 1131 THEN drop.

Using [**perror**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#perror), determine the error symbols:

shell> **perror 10927 10914 1131**

MySQL error code MY-010927 (ER\_ACCESS\_DENIED\_FOR\_USER\_ACCOUNT\_LOCKED):

Access denied for user '%-.48s'@'%-.64s'. Account is locked.

MySQL error code MY-010914 (ER\_ABORTING\_USER\_CONNECTION):

Aborted connection %u to db: '%-.192s' user: '%-.48s' host:

'%-.64s' (%-.64s).

MySQL error code MY-001131 (ER\_PASSWORD\_ANONYMOUS\_USER):

You are using MySQL as an anonymous user and anonymous users

are not allowed to change passwords

Substituting error symbols for numbers, the rule set becomes:

IF err\_code == ER\_ACCESS\_DENIED\_FOR\_USER\_ACCOUNT\_LOCKED

OR err\_code == ER\_ABORTING\_USER\_CONNECTION THEN drop.

IF err\_code == ER\_PASSWORD\_ANONYMOUS\_USER THEN drop.

Symbolic names can be specified as quoted strings for comparison with string fields, but in such cases the names are strings that have no special meaning and **log\_filter\_dragnet** does not resolve them to the corresponding numeric value. Also, typos may go undetected, whereas an error occurs immediately on **SET** for attempts to use an unquoted symbol unknown to the server.

##### Actions for log\_filter\_dragnet Rules

**log\_filter\_dragnet** supports these actions in filter rules:

* **drop**: Drop the current log event (do not log it).
* **throttle**: Apply rate limiting to reduce log verbosity for events matching particular conditions. The argument indicates a rate, in the form ***count*** or ***count***/***window\_size***. The ***count*** value indicates the permitted number of event occurrences to log per time window. The ***window\_size*** value is the time window in seconds; if omitted, the default window is 60 seconds. Both values must be integer literals.

This rule throttles plugin-shutdown messages to 5 occurrences per 60 seconds:

IF err\_code == ER\_PLUGIN\_SHUTTING\_DOWN\_PLUGIN THEN throttle 5.

This rule throttles errors and warnings to 1000 occurrences per hour and information messages to 100 occurrences per hour:

IF prio <= INFORMATION THEN throttle 1000/3600 ELSE throttle 100/3600.

* **set**: Assign a value to a field (and cause the field to exist if it did not already). In subsequent rules, **EXISTS** tests against the field name are true, and the new value can be tested by comparison conditions.
* **unset**: Discard a field. In subsequent rules, **EXISTS** tests against the field name are false, and comparisons of the field against any value are false.

In the special case that the condition refers to exactly one field name, the field name following **unset** is optional and **unset** discards the named field. These rules are equivalent:

IF myfield == 2 THEN unset myfield.

IF myfield == 2 THEN unset.

##### Field References in log\_filter\_dragnet Rules

**log\_filter\_dragnet** rules support references to core, optional, and user-defined fields in error events.

* [Core Field References](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-core-field-references)
* [Optional Field References](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-optional-field-references)
* [User-Defined Field References](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-user-defined-field-references)

###### Core Field References

The **log\_filter\_dragnet** grammar at [Grammar for log\_filter\_dragnet Rule Language](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-filtering-language) names the core fields that filter rules recognize. For general descriptions of these fields, see [Section 5.4.2.3, “Error Event Fields”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-event-fields), with which you are assumed to be familiar. The following remarks provide additional information only as it pertains specifically to core field references as used within **log\_filter\_dragnet** rules.

* **prio**

The event priority, to indicate an error, warning, or note/information event. In comparisons, each priority can be specified as a symbolic priority name or an integer literal. Priority symbols are recognized only in comparisons with the **prio** field. These comparisons are equivalent:

IF prio == INFORMATION THEN ...

IF prio == 3 THEN ...

The following table shows the permitted priority levels.

| **Event Type** | **Priority Symbol** | **Numeric Priority** |
| --- | --- | --- |
| **Error event** | **ERROR** | 1 |
| **Warning event** | **WARNING** | 2 |
| **Note/information event** | **INFORMATION** | 3 |

There is also a message priority of **SYSTEM**, but system messages cannot be filtered and are always written to the error log.

Priority values follow the principle that higher priorities have lower values, and vice versa. Priority values begin at 1 for the most severe events (errors) and increase for events with decreasing priority. For example, to discard events with priority lower than warnings, test for priority values higher than **WARNING**:

IF prio > WARNING THEN drop.

The following examples show the **log\_filter\_dragnet** rules to achieve an effect similar to each [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) value permitted by the **log\_filter\_internal** filter:

* + Errors only (**log\_error\_verbosity=1**):
  + IF prio > ERROR THEN drop.
  + Errors and warnings (**log\_error\_verbosity=2**):
  + IF prio > WARNING THEN drop.
  + Errors, warnings, and notes (**log\_error\_verbosity=3**):
  + IF prio > INFORMATION THEN drop.

This rule can actually be omitted because there are no **prio** values greater than **INFORMATION**, so effectively it drops nothing.

* **err\_code**

The numeric event error code. In comparisons, the value to test can be specified as a symbolic error name or an integer literal. Error symbols are recognized only in comparisons with the **err\_code** field and user-defined fields. These comparisons are equivalent:

IF err\_code == ER\_ACCESS\_DENIED\_ERROR THEN ...

IF err\_code == 1045 THEN ...

* **err\_symbol**

The event error symbol, as a string (for example, [**'ER\_DUP\_KEY'**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_dup_key)). **err\_symbol** values are intended more for identifying particular lines in log output than for use in filter rule comparisons because **log\_filter\_dragnet** does not resolve comparison values specified as strings to the equivalent numeric error code. (For that to occur, an error must be specified using its unquoted symbol.)

###### Optional Field References

The **log\_filter\_dragnet** grammar at [Grammar for log\_filter\_dragnet Rule Language](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-dragnet-filtering-language) names the optional fields that filter rules recognize. For general descriptions of these fields, see [Section 5.4.2.3, “Error Event Fields”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-event-fields), with which you are assumed to be familiar. The following remarks provide additional information only as it pertains specifically to optional field references as used within **log\_filter\_dragnet** rules.

* **label**

The label corresponding to the **prio** value, as a string. Filter rules can change the label for log sinks that support custom labels. **label** values are intended more for identifying particular lines in log output than for use in filter rule comparisons because **log\_filter\_dragnet** does not resolve comparison values specified as strings to the equivalent numeric priority.

* **source\_file**

The source file in which the event occurred, without any leading path. For example, to test for the sql/gis/distance.cc file, write the comparison like this:

IF source\_file == "distance.cc" THEN ...

###### User-Defined Field References

Any field name in a **log\_filter\_dragnet** filter rule not recognized as a core or optional field name is taken to refer to a user-defined field.

#### 5.4.2.7 Error Logging in JSON Format

This section describes how to configure error logging using the built-in filter, **log\_filter\_internal**, and the JSON sink, **log\_sink\_json**, to take effect immediately and for subsequent server startups. For general information about configuring error logging, see [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration).

To enable the JSON sink, first load the sink component, then modify the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value:

INSTALL COMPONENT 'file://component\_log\_sink\_json';

SET PERSIST log\_error\_services = 'log\_filter\_internal; log\_sink\_json';

To set [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) to take effect at server startup, use the instructions at [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration). Those instructions apply to other error-logging system variables as well.

It is permitted to name **log\_sink\_json** multiple times in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value. For example, to write unfiltered events with one instance and filtered events with another instance, you could set [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) like this:

SET PERSIST log\_error\_services = 'log\_sink\_json; log\_filter\_internal; log\_sink\_json';

The JSON sink determines its output destination based on the default error log destination, which is given by the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable. If [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) names a file, the JSON sink bases output file naming on that file name, plus a numbered .***NN***.json suffix, with ***NN*** starting at 00. For example, if [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) is ***file\_name***, successive instances of **log\_sink\_json** named in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value write to ***file\_name***.00.json, ***file\_name***.01.json, and so forth.

If [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) is **stderr**, the JSON sink writes to the console. If **log\_sink\_json** is named multiple times in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value, they all write to the console, which is likely not useful.

#### 5.4.2.8 Error Logging to the System Log

It is possible to have [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) write the error log to the system log (the Event Log on Windows, and **syslog** on Unix and Unix-like systems).

This section describes how to configure error logging using the built-in filter, **log\_filter\_internal**, and the system log sink, **log\_sink\_syseventlog**, to take effect immediately and for subsequent server startups. For general information about configuring error logging, see [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration).

To enable the system log sink, first load the sink component, then modify the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value:

INSTALL COMPONENT 'file://component\_log\_sink\_syseventlog';

SET PERSIST log\_error\_services = 'log\_filter\_internal; log\_sink\_syseventlog';

To set [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) to take effect at server startup, use the instructions at [Section 5.4.2.1, “Error Log Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-configuration). Those instructions apply to other error-logging system variables as well.

**Note**

For MySQL 8.0 configuration, you must enable error logging to the system log explicitly. This differs from MySQL 5.7 and earlier, for which error logging to the system log is enabled by default on Windows, and on all platforms requires no component loading.

Error logging to the system log may require additional system configuration. Consult the system log documentation for your platform.

On Windows, error messages written to the Event Log within the Application log have these characteristics:

* Entries marked as **Error**, **Warning**, and **Note** are written to the Event Log, but not messages such as information statements from individual storage engines.
* Event Log entries have a source of **MySQL** (or **MySQL-*tag*** if [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag) is defined as ***tag***).

On Unix and Unix-like systems, logging to the system log uses **syslog**. The following system variables affect **syslog** messages:

* [**syseventlog.facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.facility): The default facility for **syslog** messages is **daemon**. Set this variable to specify a different facility.
* [**syseventlog.include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.include_pid): Whether to include the server process ID in each line of **syslog** output.
* [**syseventlog.tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_syseventlog.tag): This variable defines a tag to add to the server identifier (**mysqld**) in **syslog** messages. If defined, the tag is appended to the identifier with a leading hyphen.

**Note**

Prior to MySQL 8.0.13, use the [**log\_syslog\_facility**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_facility), [**log\_syslog\_include\_pid**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_include_pid), and [**log\_syslog\_tag**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_syslog_tag) system variables rather than the **syseventlog.*xxx*** variables.

MySQL uses the custom label “System” for important system messages about non-error situations, such as startup, shutdown, and some significant changes to settings. In logs that do not support custom labels, including the Event Log on Windows, and **syslog** on Unix and Unix-like systems, system messages are assigned the label used for the information priority level. However, these messages are printed to the log even if the MySQL [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) setting normally excludes messages at the information level.

When a log sink must fall back to a label of “Information” instead of “System” in this way, and the log event is further processed outside of the MySQL server (for example, filtered or forwarded by a **syslog** configuration), these events may by default be processed by the secondary application as being of “Information” priority rather than “System” priority.

#### 5.4.2.9 Error Log Output Format

Each error log sink (writer) component has a characteristic output format it uses to write messages to its destination, but other factors may influence the content of the messages:

* The information available to the log sink. If a log filter component executed prior to execution of the sink component removes a log event field, that field is not available for writing. For information about log filtering, see [Section 5.4.2.4, “Types of Error Log Filtering”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-filtering).
* The information relevant to the log sink. Not every sink writes all fields available in error events.
* System variables may affect log sinks. See [System Variables That Affect Error Log Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format-system-variables).

For names and descriptions of the fields in error events, see [Section 5.4.2.3, “Error Event Fields”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-event-fields). For all log sinks, the thread ID included in error log messages is that of the thread within [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) responsible for writing the message. This ID indicates which part of the server produced the message, and is consistent with general query log and slow query log messages, which include the connection thread ID.

* [log\_sink\_internal Output Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format-output-format-for-log-sink-internal)
* [log\_sink\_json Output Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format-output-format-for-log-sink-json)
* [log\_sink\_syseventlog Output Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format-output-format-for-log-sink-syseventlog)
* [Early-Startup Logging Output Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format-output-format-for-early-logging)
* [System Variables That Affect Error Log Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-format-system-variables)

##### log\_sink\_internal Output Format

The internal log sink produces traditional error log output. For example:

2020-08-06T14:25:02.835618Z 0 [Note] [MY-012487] [InnoDB] DDL log recovery : begin

2020-08-06T14:25:02.936146Z 0 [Warning] [MY-010068] [Server] CA certificate /var/mysql/sslinfo/cacert.pem is self signed.

2020-08-06T14:25:02.963127Z 0 [Note] [MY-010253] [Server] IPv6 is available.

2020-08-06T14:25:03.109022Z 5 [Note] [MY-010051] [Server] Event Scheduler: scheduler thread started with id 5

Traditional-format messages have these fields:

time thread [label] [err\_code] [subsystem] msg

The **[** and **]** square bracket characters are literal characters in the message format. They do not indicate that fields are optional.

The **label** value corresponds to the string form of the **prio** error event priority field.

The **[err\_code]** and **[subsystem]** fields were added in MySQL 8.0. They are missing from logs generated by older servers. Log parsers can treat these fields as parts of the message text that is present only for logs written by servers recent enough to include them. Parsers must treat the **err\_code** part of **[err\_code]** indicators as a string value, not a number, because values such as **MY-012487** and **MY-010051** contain nonnumeric characters.

##### log\_sink\_json Output Format

The JSON-format log sink produces messages as JSON objects that contain key-value pairs. For example:

{

"prio": 3,

"err\_code": 10051,

"source\_line": 561,

"source\_file": "event\_scheduler.cc",

"function": "run",

"msg": "Event Scheduler: scheduler thread started with id 5",

"time": "2020-08-06T14:25:03.109022Z",

"ts": 1596724012005,

"thread": 5,

"err\_symbol": "ER\_SCHEDULER\_STARTED",

"SQL\_state": "HY000",

"subsystem": "Server",

"buffered": 1596723903109022,

"label": "Note"

}

The message shown is reformatted for readability. Events written to the error log appear one message per line.

The **ts** (timestamp) key was added in MySQL 8.0.20 and is unique to the JSON-format log sink. The value is an integer indicating milliseconds since the epoch (**'1970-01-01 00:00:00'** UTC).

The **ts** and **buffered** values are Unix timestamp values and can be converted using **FROM\_UNIXTIME()** and an appropriate divisor:

mysql> **SET time\_zone = '+00:00';**

mysql> **SELECT FROM\_UNIXTIME(1596724012005/1000.0);**

+-------------------------------------+

| FROM\_UNIXTIME(1596724012005/1000.0) |

+-------------------------------------+

| 2020-08-06 14:26:52.0050 |

+-------------------------------------+

mysql> **SELECT FROM\_UNIXTIME(1596723903109022/1000000.0);**

+-------------------------------------------+

| FROM\_UNIXTIME(1596723903109022/1000000.0) |

+-------------------------------------------+

| 2020-08-06 14:25:03.1090 |

+-------------------------------------------+

##### log\_sink\_syseventlog Output Format

The system log sink produces output that conforms to the system log format used on the local platform.

##### Early-Startup Logging Output Format

The server generates some error log messages before startup options have been processed, and thus before it knows error log settings such as the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) system variable values, and before it knows which log components are to be used. The server handles error log messages that are generated early in the startup process as follows:

* Prior to MySQL 8.0.14, the server generates messages with the default timestamp, format, and verbosity level, and buffers them. After the startup options are processed and the error log configuration is known, the server flushes the buffered messages. Because these early messages use the default log configuration, they may differ from what is specified by the startup options. Also, the early messages are not flushed to log sinks other than the default. For example, logging to the JSON sink does not include these early messages because they are not in JSON format.
* As of MySQL 8.0.14, the server buffers log events rather than formatted log messages. This enables it to retroactively apply configuration settings to those events after the settings are known, with the result that flushed messages use the configured settings, not the defaults. Also, messages are flushed to all configured sinks, not just the default sink.

If a fatal error occurs before log configuration is known and the server must exit, the server formats buffered messages using the logging defaults so they are not lost. If no fatal error occurs but startup is excessively slow prior to processing startup options, the server periodically formats and flushes buffered messages using the logging defaults so as not to appear unresponsive. Although this behavior is similar to pre-8.0.14 behavior in that the defaults are used, it is preferable to losing messages when exceptional conditions occur.

##### System Variables That Affect Error Log Format

The [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) system variable controls the time zone of timestamps in messages written to the error log (as well as to general query log and slow query log files). The server applies [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) to error events before they reach any log sink; it thus affects error message output from all sinks.

Permitted [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) values are **UTC** (the default) and **SYSTEM** (the local system time zone). Timestamps are written using ISO 8601 / RFC 3339 format: ***YYYY-MM-DD*T*hh:mm:ss.uuuuuu*** plus a tail value of **Z** signifying Zulu time (UTC) or **±hh:mm** (an offset that indicates the local system time zone adjustment relative to UTC). For example:

2020-08-07T15:02:00.832521Z (UTC)

2020-08-07T10:02:00.832521-05:00 (SYSTEM)

#### 5.4.2.10 Error Log File Flushing and Renaming

If you flush the error log using a [**FLUSH ERROR LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-error-logs) or [**FLUSH LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-logs) statment, or a [**mysqladmin flush-logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) command, the server closes and reopens any error log file to which it is writing. To rename an error log file, do so manually before flushing. Flushing the logs then opens a new file with the original file name. For example, assuming a log file name of ***host\_name***.err, use the following commands to rename the file and create a new one:

mv ***host\_name***.err ***host\_name***.err-old

mysqladmin flush-logs

mv ***host\_name***.err-old ***backup-directory***

On Windows, use **rename** rather than **mv**.

If the location of the error log file is not writable by the server, the log-flushing operation fails to create a new log file. For example, on Linux, the server might write the error log to the /var/log/mysqld.log file, where the /var/log directory is owned by **root** and is not writable by [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld). For information about handling this case, see [Section 5.4.6, “Server Log Maintenance”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-file-maintenance).

If the server is not writing to a named error log file, no error log file renaming occurs when the error log is flushed.

### 5.4.3 The General Query Log

The general query log is a general record of what [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) is doing. The server writes information to this log when clients connect or disconnect, and it logs each SQL statement received from clients. The general query log can be very useful when you suspect an error in a client and want to know exactly what the client sent to [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).

Each line that shows when a client connects also includes **using *connection\_type*** to indicate the protocol used to establish the connection. ***connection\_type*** is one of **TCP/IP** (TCP/IP connection established without SSL), **SSL/TLS** (TCP/IP connection established with SSL), **Socket** (Unix socket file connection), **Named Pipe** (Windows named pipe connection), or **Shared Memory** (Windows shared memory connection).

[**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) writes statements to the query log in the order that it receives them, which might differ from the order in which they are executed. This logging order is in contrast with that of the binary log, for which statements are written after they are executed but before any locks are released. In addition, the query log may contain statements that only select data while such statements are never written to the binary log.

When using statement-based binary logging on a replication source server, statements received by its replicas are written to the query log of each replica. Statements are written to the query log of the source if a client reads events with the [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) utility and passes them to the server.

However, when using row-based binary logging, updates are sent as row changes rather than SQL statements, and thus these statements are never written to the query log when [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) is **ROW**. A given update also might not be written to the query log when this variable is set to **MIXED**, depending on the statement used. See [Section 17.2.1.1, “Advantages and Disadvantages of Statement-Based and Row-Based Replication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-sbr-rbr), for more information.

By default, the general query log is disabled. To specify the initial general query log state explicitly, use [--general\_log[={0|1}]](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log). With no argument or an argument of 1, [--general\_log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) enables the log. With an argument of 0, this option disables the log. To specify a log file name, use [--general\_log\_file=***file\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file). To specify the log destination, use the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable (as described in [Section 5.4.1, “Selecting General Query Log and Slow Query Log Output Destinations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations)).

**Note**

If you specify the **TABLE** log destination, see [Log Tables and “Too many open files” Errors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations-tables-open-files).

If you specify no name for the general query log file, the default name is ***host\_name***.log. The server creates the file in the data directory unless an absolute path name is given to specify a different directory.

To disable or enable the general query log or change the log file name at runtime, use the global [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) and [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) system variables. Set [**general\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log) to 0 (or **OFF**) to disable the log or to 1 (or **ON**) to enable it. Set [**general\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_general_log_file) to specify the name of the log file. If a log file already is open, it is closed and the new file is opened.

When the general query log is enabled, the server writes output to any destinations specified by the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable. If you enable the log, the server opens the log file and writes startup messages to it. However, further logging of queries to the file does not occur unless the **FILE** log destination is selected. If the destination is **NONE**, the server writes no queries even if the general log is enabled. Setting the log file name has no effect on logging if the log destination value does not contain **FILE**.

Server restarts and log flushing do not cause a new general query log file to be generated (although flushing closes and reopens it). To rename the file and create a new one, use the following commands:

shell> **mv *host\_name*.log *host\_name*-old.log**

shell> **mysqladmin flush-logs**

shell> **mv *host\_name*-old.log *backup-directory***

On Windows, use **rename** rather than **mv**.

You can also rename the general query log file at runtime by disabling the log:

SET GLOBAL general\_log = 'OFF';

With the log disabled, rename the log file externally (for example, from the command line). Then enable the log again:

SET GLOBAL general\_log = 'ON';

This method works on any platform and does not require a server restart.

To disable or enable general query logging for the current session, set the session [**sql\_log\_off**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_log_off) variable to **ON** or **OFF**. (This assumes that the general query log itself is enabled.)

Passwords in statements written to the general query log are rewritten by the server not to occur literally in plain text. Password rewriting can be suppressed for the general query log by starting the server with the [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) option. This option may be useful for diagnostic purposes, to see the exact text of statements as received by the server, but for security reasons is not recommended for production use. See also [Section 6.1.2.3, “Passwords and Logging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-logging).

An implication of password rewriting is that statements that cannot be parsed (due, for example, to syntax errors) are not written to the general query log because they cannot be known to be password free. Use cases that require logging of all statements including those with errors should use the [--log-raw](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-raw) option, bearing in mind that this also bypasses password rewriting.

Password rewriting occurs only when plain text passwords are expected. For statements with syntax that expect a password hash value, no rewriting occurs. If a plain text password is supplied erroneously for such syntax, the password is logged as given, without rewriting.

The [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) system variable controls the time zone of timestamps in messages written to the general query log file (as well as to the slow query log file and the error log). It does not affect the time zone of general query log and slow query log messages written to log tables, but rows retrieved from those tables can be converted from the local system time zone to any desired time zone with [**CONVERT\_TZ()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_convert-tz) or by setting the session [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) system variable.

### 5.4.4 The Binary Log

[5.4.4.1 Binary Logging Formats](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log-formats)

[5.4.4.2 Setting The Binary Log Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log-setting)

[5.4.4.3 Mixed Binary Logging Format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log-mixed)

[5.4.4.4 Logging Format for Changes to mysql Database Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log-mysql-database)

[5.4.4.5 Binary Log Transaction Compression](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log-transaction-compression)

The binary log contains “events” that describe database changes such as table creation operations or changes to table data. It also contains events for statements that potentially could have made changes (for example, a [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) which matched no rows), unless row-based logging is used. The binary log also contains information about how long each statement took that updated data. The binary log has two important purposes:

* For replication, the binary log on a replication source server provides a record of the data changes to be sent to replicas. The source sends the information contained in its binary log to its replicas, which reproduce those transactions to make the same data changes that were made on the source. See [Section 17.2, “Replication Implementation”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-implementation).
* Certain data recovery operations require use of the binary log. After a backup has been restored, the events in the binary log that were recorded after the backup was made are re-executed. These events bring databases up to date from the point of the backup. See [Section 7.5, “Point-in-Time (Incremental) Recovery”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\backup-and-recovery.html#point-in-time-recovery).

The binary log is not used for statements such as [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) or [**SHOW**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show) that do not modify data. To log all statements (for example, to identify a problem query), use the general query log. See [Section 5.4.3, “The General Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#query-log).

Running a server with binary logging enabled makes performance slightly slower. However, the benefits of the binary log in enabling you to set up replication and for restore operations generally outweigh this minor performance decrement.

The binary log is resilient to unexpected halts. Only complete events or transactions are logged or read back.

Passwords in statements written to the binary log are rewritten by the server not to occur literally in plain text. See also [Section 6.1.2.3, “Passwords and Logging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-logging).

From MySQL 8.0.14, binary log files and relay log files can be encrypted, helping to protect these files and the potentially sensitive data contained in them from being misused by outside attackers, and also from unauthorized viewing by users of the operating system where they are stored. You enable encryption on a MySQL server by setting the [**binlog\_encryption**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_encryption) system variable to **ON**. For more information, see [Section 17.3.2, “Encrypting Binary Log Files and Relay Log Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-binlog-encryption).

The following discussion describes some of the server options and variables that affect the operation of binary logging. For a complete list, see [Section 17.1.6.4, “Binary Logging Options and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-options-binary-log).

Binary logging is enabled by default (the [**log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin) system variable is set to ON). The exception is if you use [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to initialize the data directory manually by invoking it with the [--initialize](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize) or [--initialize-insecure](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_initialize-insecure) option, when binary logging is disabled by default, but can be enabled by specifying the [--log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) option.

To disable binary logging, you can specify the [--skip-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) or [--disable-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) option at startup. If either of these options is specified and [--log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) is also specified, the option specified later takes precedence.

The [--log-slave-updates](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slave_updates) and [--slave-preserve-commit-order](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_preserve_commit_order) options require binary logging. If you disable binary logging, either omit these options, or specify [--log-slave-updates=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slave_updates) and [--skip-slave-preserve-commit-order](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_preserve_commit_order). MySQL disables these options by default when [--skip-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) or [--disable-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) is specified. If you specify [--log-slave-updates](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slave_updates) or [--slave-preserve-commit-order](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_preserve_commit_order) together with [--skip-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) or [--disable-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin), a warning or error message is issued.

The [--log-bin[=***base\_name***]](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) option is used to specify the base name for binary log files. If you do not supply the --log-bin option, MySQL uses binlog as the default base name for the binary log files. For compatibility with earlier releases, if you supply the --log-bin option with no string or with an empty string, the base name defaults to ***host\_name***-bin, using the name of the host machine. It is recommended that you specify a base name, so that if the host name changes, you can easily continue to use the same binary log file names (see [Section B.3.7, “Known Issues in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#known-issues)). If you supply an extension in the log name (for example, [--log-bin=***base\_name.extension***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin)), the extension is silently removed and ignored.

[**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) appends a numeric extension to the binary log base name to generate binary log file names. The number increases each time the server creates a new log file, thus creating an ordered series of files. The server creates a new file in the series each time any of the following events occurs:

* The server is started or restarted
* The server flushes the logs.
* The size of the current log file reaches [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size).

A binary log file may become larger than [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size) if you are using large transactions because a transaction is written to the file in one piece, never split between files.

To keep track of which binary log files have been used, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) also creates a binary log index file that contains the names of the binary log files. By default, this has the same base name as the binary log file, with the extension **'.index'**. You can change the name of the binary log index file with the [--log-bin-index[=***file\_name***]](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin-index) option. You should not manually edit this file while [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) is running; doing so would confuse [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).

The term “binary log file” generally denotes an individual numbered file containing database events. The term “binary log” collectively denotes the set of numbered binary log files plus the index file.

The default location for binary log files and the binary log index file is the data directory. You can use the [--log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) option to specify an alternative location, by adding a leading absolute path name to the base name to specify a different directory. When the server reads an entry from the binary log index file, which tracks the binary log files that have been used, it checks whether the entry contains a relative path. If it does, the relative part of the path is replaced with the absolute path set using the [--log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) option. An absolute path recorded in the binary log index file remains unchanged; in such a case, the index file must be edited manually to enable a new path or paths to be used. The binary log file base name and any specified path are available as the [**log\_bin\_basename**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin_basename) system variable.

In MySQL 5.7, a server ID had to be specified when binary logging was enabled, or the server would not start. In MySQL 8.0, the [**server\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_id) system variable is set to 1 by default. The server can be started with this default ID when binary logging is enabled, but an informational message is issued if you do not specify a server ID explicitly using the [**server\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_server_id) system variable. For servers that are used in a replication topology, you must specify a unique nonzero server ID for each server.

A client that has privileges sufficient to set restricted session system variables (see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges)) can disable binary logging of its own statements by using a [**SET sql\_log\_bin=OFF**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-sql-log-bin) statement.

By default, the server logs the length of the event as well as the event itself and uses this to verify that the event was written correctly. You can also cause the server to write checksums for the events by setting the [**binlog\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_checksum) system variable. When reading back from the binary log, the source uses the event length by default, but can be made to use checksums if available by enabling the [**master\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_verify_checksum) system variable. The replication I/O thread on the replica also verifies events received from the source. You can cause the replication SQL thread to use checksums if available when reading from the relay log by enabling the [**slave\_sql\_verify\_checksum**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_sql_verify_checksum) system variable.

The format of the events recorded in the binary log is dependent on the binary logging format. Three format types are supported: row-based logging, statement-based logging and mixed-base logging. The binary logging format used depends on the MySQL version. For general descriptions of the logging formats, see [Section 5.4.4.1, “Binary Logging Formats”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log-formats). For detailed information about the format of the binary log, see [MySQL Internals: The Binary Log](https://dev.mysql.com/doc/internals/en/binary-log.html).

The server evaluates the [--binlog-do-db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-do-db) and [--binlog-ignore-db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-ignore-db) options in the same way as it does the [--replicate-do-db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-do-db) and [--replicate-ignore-db](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_replicate-ignore-db) options. For information about how this is done, see [Section 17.2.5.1, “Evaluation of Database-Level Replication and Binary Logging Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-rules-db-options).

A replica is started with the [**log\_slave\_updates**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slave_updates) system variable enabled by default, meaning that the replica writes to its own binary log any data modifications that are received from the source. The binary log must be enabled for this setting to work (see [Section 17.1.6.3, “Replica Server Options and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-options-replica)). This setting enables the replica to act as a source to other replicas.

You can delete all binary log files with the [**RESET MASTER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-master) statement, or a subset of them with [**PURGE BINARY LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#purge-binary-logs). See [Section 13.7.8.6, “RESET Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset), and [Section 13.4.1.1, “PURGE BINARY LOGS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#purge-binary-logs).

If you are using replication, you should not delete old binary log files on the source until you are sure that no replica still needs to use them. For example, if your replicas never run more than three days behind, once a day you can execute [**mysqladmin flush-logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) on the source and then remove any logs that are more than three days old. You can remove the files manually, but it is preferable to use [**PURGE BINARY LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#purge-binary-logs), which also safely updates the binary log index file for you (and which can take a date argument). See [Section 13.4.1.1, “PURGE BINARY LOGS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#purge-binary-logs).

You can display the contents of binary log files with the [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) utility. This can be useful when you want to reprocess statements in the log for a recovery operation. For example, you can update a MySQL server from the binary log as follows:

shell> **mysqlbinlog *log\_file* | mysql -h *server\_name***

[**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) also can be used to display the contents of the relay log file on a replica, because they are written using the same format as binary log files. For more information on the [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) utility and how to use it, see [Section 4.6.9, “mysqlbinlog — Utility for Processing Binary Log Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog). For more information about the binary log and recovery operations, see [Section 7.5, “Point-in-Time (Incremental) Recovery”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\backup-and-recovery.html#point-in-time-recovery).

Binary logging is done immediately after a statement or transaction completes but before any locks are released or any commit is done. This ensures that the log is logged in commit order.

Updates to nontransactional tables are stored in the binary log immediately after execution.

Within an uncommitted transaction, all updates ([**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update), [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete), or [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert)) that change transactional tables such as **InnoDB** tables are cached until a [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statement is received by the server. At that point, [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) writes the entire transaction to the binary log before the [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) is executed.

Modifications to nontransactional tables cannot be rolled back. If a transaction that is rolled back includes modifications to nontransactional tables, the entire transaction is logged with a [**ROLLBACK**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statement at the end to ensure that the modifications to those tables are replicated.

When a thread that handles the transaction starts, it allocates a buffer of [**binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_cache_size) to buffer statements. If a statement is bigger than this, the thread opens a temporary file to store the transaction. The temporary file is deleted when the thread ends. From MySQL 8.0.17, if binary log encryption is active on the server, the temporary file is encrypted.

The [**Binlog\_cache\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_cache_use) status variable shows the number of transactions that used this buffer (and possibly a temporary file) for storing statements. The [**Binlog\_cache\_disk\_use**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Binlog_cache_disk_use) status variable shows how many of those transactions actually had to use a temporary file. These two variables can be used for tuning [**binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_cache_size) to a large enough value that avoids the use of temporary files.

The [**max\_binlog\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_cache_size) system variable (default 4GB, which is also the maximum) can be used to restrict the total size used to cache a multiple-statement transaction. If a transaction is larger than this many bytes, it fails and rolls back. The minimum value is 4096.

If you are using the binary log and row based logging, concurrent inserts are converted to normal inserts for **CREATE ... SELECT** or [**INSERT ... SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert-select) statements. This is done to ensure that you can re-create an exact copy of your tables by applying the log during a backup operation. If you are using statement-based logging, the original statement is written to the log.

The binary log format has some known limitations that can affect recovery from backups. See [Section 17.5.1, “Replication Features and Issues”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features).

Binary logging for stored programs is done as described in [Section 25.7, “Stored Program Binary Logging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\stored-objects.html#stored-programs-logging).

Note that the binary log format differs in MySQL 8.0 from previous versions of MySQL, due to enhancements in replication. See [Section 17.5.2, “Replication Compatibility Between MySQL Versions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-compatibility).

If the server is unable to write to the binary log, flush binary log files, or synchronize the binary log to disk, the binary log on the replication source server can become inconsistent and replicas can lose synchronization with the source. The [**binlog\_error\_action**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_error_action) system variable controls the action taken if an error of this type is encountered with the binary log.

* The default setting, **ABORT\_SERVER**, makes the server halt binary logging and shut down. At this point, you can identify and correct the cause of the error. On restart, recovery proceeds as in the case of an unexpected server halt (see [Section 17.4.2, “Handling an Unexpected Halt of a Replica”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-solutions-unexpected-replica-halt)).
* The setting **IGNORE\_ERROR** provides backward compatibility with older versions of MySQL. With this setting, the server continues the ongoing transaction and logs the error, then halts binary logging, but continues to perform updates. At this point, you can identify and correct the cause of the error. To resume binary logging, [**log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin) must be enabled again, which requires a server restart. Only use this option if you require backward compatibility, and the binary log is non-essential on this MySQL server instance. For example, you might use the binary log only for intermittent auditing or debugging of the server, and not use it for replication from the server or rely on it for point-in-time restore operations.

By default, the binary log is synchronized to disk at each write ([**sync\_binlog=1**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog)). If [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) was not enabled, and the operating system or machine (not only the MySQL server) crashed, there is a chance that the last statements of the binary log could be lost. To prevent this, enable the [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) system variable to synchronize the binary log to disk after every ***N*** commit groups. See [Section 5.1.8, “Server System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-system-variables). The safest value for [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) is 1 (the default), but this is also the slowest.

In earlier MySQL releases, there was a chance of inconsistency between the table content and binary log content if a crash occurred, even with [**sync\_binlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sync_binlog) set to 1. For example, if you are using **InnoDB** tables and the MySQL server processes a [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit) statement, it writes many prepared transactions to the binary log in sequence, synchronizes the binary log, and then commits the transaction into **InnoDB**. If the server unexpectedly exited between those two operations, the transaction would be rolled back by **InnoDB** at restart but still exist in the binary log. Such an issue was resolved in previous releases by enabling **InnoDB** support for two-phase commit in XA transactions. In 8.0.0 and higher, the **InnoDB** support for two-phase commit in XA transactions is always enabled.

**InnoDB** support for two-phase commit in XA transactions ensures that the binary log and **InnoDB** data files are synchronized. However, the MySQL server should also be configured to synchronize the binary log and the **InnoDB** logs to disk before committing the transaction. The **InnoDB** logs are synchronized by default, and **sync\_binlog=1** ensures the binary log is synchronized. The effect of implicit **InnoDB** support for two-phase commit in XA transactions and **sync\_binlog=1** is that at restart after a crash, after doing a rollback of transactions, the MySQL server scans the latest binary log file to collect transaction ***xid*** values and calculate the last valid position in the binary log file. The MySQL server then tells **InnoDB** to complete any prepared transactions that were successfully written to the to the binary log, and truncates the binary log to the last valid position. This ensures that the binary log reflects the exact data of **InnoDB** tables, and therefore the replica remains in synchrony with the source because it does not receive a statement which has been rolled back.

If the MySQL server discovers at crash recovery that the binary log is shorter than it should have been, it lacks at least one successfully committed **InnoDB** transaction. This should not happen if **sync\_binlog=1** and the disk/file system do an actual sync when they are requested to (some do not), so the server prints an error message **The binary log *file\_name* is shorter than its expected size**. In this case, this binary log is not correct and replication should be restarted from a fresh snapshot of the source's data.

The session values of the following system variables are written to the binary log and honored by the replica when parsing the binary log:

* [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode) (except that the [**NO\_DIR\_IN\_CREATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_dir_in_create) mode is not replicated; see [Section 17.5.1.39, “Replication and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-variables))
* [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks)
* [**unique\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_unique_checks)
* [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client)
* [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection)
* [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database)
* [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server)
* [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null)

#### 5.4.4.1 Binary Logging Formats

The server uses several logging formats to record information in the binary log:

* Replication capabilities in MySQL originally were based on propagation of SQL statements from source to replica. This is called statement-based logging. You can cause this format to be used by starting the server with [--binlog-format=STATEMENT](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format).
* In row-based logging (the default), the source writes events to the binary log that indicate how individual table rows are affected. You can cause the server to use row-based logging by starting it with [--binlog-format=ROW](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format).
* A third option is also available: mixed logging. With mixed logging, statement-based logging is used by default, but the logging mode switches automatically to row-based in certain cases as described below. You can cause MySQL to use mixed logging explicitly by starting [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the option [--binlog-format=MIXED](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format).

The logging format can also be set or limited by the storage engine being used. This helps to eliminate issues when replicating certain statements between a source and replica which are using different storage engines.

With statement-based replication, there may be issues with replicating nondeterministic statements. In deciding whether or not a given statement is safe for statement-based replication, MySQL determines whether it can guarantee that the statement can be replicated using statement-based logging. If MySQL cannot make this guarantee, it marks the statement as potentially unreliable and issues the warning, Statement may not be safe to log in statement format.

You can avoid these issues by using MySQL's row-based replication instead.

#### 5.4.4.2 Setting The Binary Log Format

You can select the binary logging format explicitly by starting the MySQL server with [--binlog-format=***type***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format). The supported values for ***type*** are:

* **STATEMENT** causes logging to be statement based.
* **ROW** causes logging to be row based. This is the default.
* **MIXED** causes logging to use mixed format.

Setting the binary logging format does not activate binary logging for the server. The setting only takes effect when binary logging is enabled on the server, which is the case when the [**log\_bin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_bin) system variable is set to **ON**. From MySQL 8.0, binary logging is enabled by default, and is only disabled if you specify the [--skip-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) or [--disable-log-bin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_log-bin) option at startup.

The logging format also can be switched at runtime, although note that there are a number of situations in which you cannot do this, as discussed later in this section. Set the global value of the [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) system variable to specify the format for clients that connect subsequent to the change:

mysql> **SET GLOBAL binlog\_format = 'STATEMENT';**

mysql> **SET GLOBAL binlog\_format = 'ROW';**

mysql> **SET GLOBAL binlog\_format = 'MIXED';**

An individual client can control the logging format for its own statements by setting the session value of [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format):

mysql> **SET SESSION binlog\_format = 'STATEMENT';**

mysql> **SET SESSION binlog\_format = 'ROW';**

mysql> **SET SESSION binlog\_format = 'MIXED';**

Changing the global [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) value requires privileges sufficient to set global system variables. Changing the session [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) value requires privileges sufficient to set restricted session system variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

There are several reasons why a client might want to set binary logging on a per-session basis:

* A session that makes many small changes to the database might want to use row-based logging.
* A session that performs updates that match many rows in the **WHERE** clause might want to use statement-based logging because it is more efficient to log a few statements than many rows.
* Some statements require a lot of execution time on the source, but result in just a few rows being modified. It might therefore be beneficial to replicate them using row-based logging.

There are exceptions when you cannot switch the replication format at runtime:

* The replication format cannot be changed from within a stored function or a trigger.
* If the [**NDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html) storage engine is enabled.
* If a session has open temporary tables, the replication format cannot be changed for the session (**SET @@SESSION.binlog\_format**).
* If any replication channel has open temporary tables, the replication format cannot be changed globally (**SET @@GLOBAL.binlog\_format** or **SET @@PERSIST.binlog\_format**).
* If any replication channel applier thread is currently running, the replication format cannot be changed globally (**SET @@GLOBAL.binlog\_format** or **SET @@PERSIST.binlog\_format**).

Trying to switch the replication format in any of these cases (or attempting to set the current replication format) results in an error. You can, however, use **PERSIST\_ONLY** (**SET @@PERSIST\_ONLY.binlog\_format**) to change the replication format at any time, because this action does not modify the runtime global system variable value, and takes effect only after a server restart.

Switching the replication format at runtime is not recommended when any temporary tables exist, because temporary tables are logged only when using statement-based replication, whereas with row-based replication and mixed replication, they are not logged.

Switching the replication format while replication is ongoing can also cause issues. Each MySQL Server can set its own and only its own binary logging format (true whether [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) is set with global or session scope). This means that changing the logging format on a replication source server does not cause a replica to change its logging format to match. When using **STATEMENT** mode, the [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) system variable is not replicated. When using **MIXED** or **ROW** logging mode, it is replicated but is ignored by the replica.

A replica is not able to convert binary log entries received in **ROW** logging format to **STATEMENT** format for use in its own binary log. The replica must therefore use **ROW** or **MIXED** format if the source does. Changing the binary logging format on the source from **STATEMENT** to **ROW** or **MIXED** while replication is ongoing to a replica with **STATEMENT** format can cause replication to fail with errors such as Error executing row event: 'Cannot execute statement: impossible to write to binary log since statement is in row format and BINLOG\_FORMAT = STATEMENT.' Changing the binary logging format on the replica to **STATEMENT** format when the source is still using **MIXED** or **ROW** format also causes the same type of replication failure. To change the format safely, you must stop replication and ensure that the same change is made on both the source and the replica.

If you are using [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html) tables and the transaction isolation level is [**READ COMMITTED**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_read-committed) or [**READ UNCOMMITTED**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_read-uncommitted), only row-based logging can be used. It is possible to change the logging format to **STATEMENT**, but doing so at runtime leads very rapidly to errors because **InnoDB** can no longer perform inserts.

With the binary log format set to **ROW**, many changes are written to the binary log using the row-based format. Some changes, however, still use the statement-based format. Examples include all DDL (data definition language) statements such as [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table), [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), or [**DROP TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-table).

When row-based binary logging is used, the [**binlog\_row\_event\_max\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_row_event_max_size) system variable and its corresponding startup option [--binlog-row-event-max-size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-row-event-max-size) set a soft limit on the maximum size of row events. The default value is 8192 bytes, and the value can only be changed at server startup. Where possible, rows stored in the binary log are grouped into events with a size not exceeding the value of this setting. If an event cannot be split, the maximum size can be exceeded.

The [--binlog-row-event-max-size](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#option_mysqld_binlog-row-event-max-size) option is available for servers that are capable of row-based replication. Rows are stored into the binary log in chunks having a size in bytes not exceeding the value of this option. The value must be a multiple of 256. The default value is 8192.

**Warning**

When using statement-based logging for replication, it is possible for the data on the source and replica to become different if a statement is designed in such a way that the data modification is nondeterministic; that is, it is left up to the query optimizer. In general, this is not a good practice even outside of replication. For a detailed explanation of this issue, see [Section B.3.7, “Known Issues in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#known-issues).

#### 5.4.4.3 Mixed Binary Logging Format

When running in **MIXED** logging format, the server automatically switches from statement-based to row-based logging under the following conditions:

* When a function contains [**UUID()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_uuid).
* When one or more tables with **AUTO\_INCREMENT** columns are updated and a trigger or stored function is invoked. Like all other unsafe statements, this generates a warning if [**binlog\_format = STATEMENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format).

For more information, see [Section 17.5.1.1, “Replication and AUTO\_INCREMENT”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-auto-increment).

* When the body of a view requires row-based replication, the statement creating the view also uses it. For example, this occurs when the statement creating a view uses the [**UUID()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_uuid) function.
* When a call to a loadable function is involved.
* When [**FOUND\_ROWS()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_found-rows) or [**ROW\_COUNT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_row-count) is used. (Bug #12092, Bug #30244)
* When [**USER()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_user), [**CURRENT\_USER()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_current-user), or [**CURRENT\_USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_current-user) is used. (Bug #28086)
* When one of the tables involved is a log table in the **mysql** database.
* When the [**LOAD\_FILE()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_load-file) function is used. (Bug #39701)
* When a statement refers to one or more system variables. (Bug #31168)

**Exception.** The following system variables, when used with session scope (only), do not cause the logging format to switch:

* + [**auto\_increment\_increment**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_increment)
  + [**auto\_increment\_offset**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_auto_increment_offset)
  + [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client)
  + [**character\_set\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_connection)
  + [**character\_set\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_database)
  + [**character\_set\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_server)
  + [**collation\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_connection)
  + [**collation\_database**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_database)
  + [**collation\_server**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_collation_server)
  + [**foreign\_key\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_foreign_key_checks)
  + [**identity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_identity)
  + [**last\_insert\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_last_insert_id)
  + [**lc\_time\_names**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lc_time_names)
  + [**pseudo\_thread\_id**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_pseudo_thread_id)
  + [**sql\_auto\_is\_null**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_auto_is_null)
  + [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone)
  + [**timestamp**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_timestamp)
  + [**unique\_checks**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_unique_checks)

For information about determining system variable scope, see [Section 5.1.9, “Using System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#using-system-variables).

For information about how replication treats [**sql\_mode**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_sql_mode), see [Section 17.5.1.39, “Replication and Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-features-variables).

In earlier releases, when mixed binary logging format was in use, if a statement was logged by row and the session that executed the statement had any temporary tables, all subsequent statements were treated as unsafe and logged in row-based format until all temporary tables in use by that session were dropped. As of MySQL 8.0, operations on temporary tables are not logged in mixed binary logging format, and the presence of temporary tables in the session has no impact on the logging mode used for each statement.

**Note**

A warning is generated if you try to execute a statement using statement-based logging that should be written using row-based logging. The warning is shown both in the client (in the output of [**SHOW WARNINGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings)) and through the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) error log. A warning is added to the [**SHOW WARNINGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings) table each time such a statement is executed. However, only the first statement that generated the warning for each client session is written to the error log to prevent flooding the log.

In addition to the decisions above, individual engines can also determine the logging format used when information in a table is updated. The logging capabilities of an individual engine can be defined as follows:

* If an engine supports row-based logging, the engine is said to be row-logging capable.
* If an engine supports statement-based logging, the engine is said to be statement-logging capable.

A given storage engine can support either or both logging formats. The following table lists the formats supported by each engine.

| **Storage Engine** | **Row Logging Supported** | **Statement Logging Supported** |
| --- | --- | --- |
| **ARCHIVE** | Yes | Yes |
| **BLACKHOLE** | Yes | Yes |
| **CSV** | Yes | Yes |
| **EXAMPLE** | Yes | No |
| **FEDERATED** | Yes | Yes |
| **HEAP** | Yes | Yes |
| **InnoDB** | Yes | Yes when the transaction isolation level is [**REPEATABLE READ**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_repeatable-read) or [**SERIALIZABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#isolevel_serializable); No otherwise. |
| **MyISAM** | Yes | Yes |
| **MERGE** | Yes | Yes |
| [**NDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\mysql-cluster.html) | Yes | No |

Whether a statement is to be logged and the logging mode to be used is determined according to the type of statement (safe, unsafe, or binary injected), the binary logging format (**STATEMENT**, **ROW**, or **MIXED**), and the logging capabilities of the storage engine (statement capable, row capable, both, or neither). (Binary injection refers to logging a change that must be logged using **ROW** format.)

Statements may be logged with or without a warning; failed statements are not logged, but generate errors in the log. This is shown in the following decision table. ***Type***, ***binlog\_format***, ***SLC***, and ***RLC*** columns outline the conditions, and ***Error / Warning*** and ***Logged as*** columns represent the corresponding actions. ***SLC*** stands for “statement-logging capable”, and ***RLC*** stands for “row-logging capable”.

| **Type** | [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) | **SLC** | **RLC** | **Error / Warning** | **Logged as** |
| --- | --- | --- | --- | --- | --- |
| **\*** | **\*** | No | No | Error: Cannot execute statement: Binary logging is impossible since at least one engine is involved that is both row-incapable and statement-incapable. | **-** |
| **Safe** | **STATEMENT** | Yes | No | - | **STATEMENT** |
| **Safe** | **MIXED** | Yes | No | - | **STATEMENT** |
| **Safe** | **ROW** | Yes | No | Error: Cannot execute statement: Binary logging is impossible since **BINLOG\_FORMAT = ROW** and at least one table uses a storage engine that is not capable of row-based logging. | **-** |
| **Unsafe** | **STATEMENT** | Yes | No | Warning: Unsafe statement binlogged in statement format, since **BINLOG\_FORMAT = STATEMENT** | **STATEMENT** |
| **Unsafe** | **MIXED** | Yes | No | Error: Cannot execute statement: Binary logging of an unsafe statement is impossible when the storage engine is limited to statement-based logging, even if **BINLOG\_FORMAT = MIXED**. | **-** |
| **Unsafe** | **ROW** | Yes | No | Error: Cannot execute statement: Binary logging is impossible since **BINLOG\_FORMAT = ROW** and at least one table uses a storage engine that is not capable of row-based logging. | - |
| **Row Injection** | **STATEMENT** | Yes | No | Error: Cannot execute row injection: Binary logging is not possible since at least one table uses a storage engine that is not capable of row-based logging. | - |
| **Row Injection** | **MIXED** | Yes | No | Error: Cannot execute row injection: Binary logging is not possible since at least one table uses a storage engine that is not capable of row-based logging. | - |
| **Row Injection** | **ROW** | Yes | No | Error: Cannot execute row injection: Binary logging is not possible since at least one table uses a storage engine that is not capable of row-based logging. | - |
| **Safe** | **STATEMENT** | No | Yes | Error: Cannot execute statement: Binary logging is impossible since **BINLOG\_FORMAT = STATEMENT** and at least one table uses a storage engine that is not capable of statement-based logging. | **-** |
| **Safe** | **MIXED** | No | Yes | - | **ROW** |
| **Safe** | **ROW** | No | Yes | - | **ROW** |
| **Unsafe** | **STATEMENT** | No | Yes | Error: Cannot execute statement: Binary logging is impossible since **BINLOG\_FORMAT = STATEMENT** and at least one table uses a storage engine that is not capable of statement-based logging. | - |
| **Unsafe** | **MIXED** | No | Yes | - | **ROW** |
| **Unsafe** | **ROW** | No | Yes | - | **ROW** |
| **Row Injection** | **STATEMENT** | No | Yes | Error: Cannot execute row injection: Binary logging is not possible since **BINLOG\_FORMAT = STATEMENT**. | **-** |
| **Row Injection** | **MIXED** | No | Yes | - | **ROW** |
| **Row Injection** | **ROW** | No | Yes | - | **ROW** |
| **Safe** | **STATEMENT** | Yes | Yes | - | **STATEMENT** |
| **Safe** | **MIXED** | Yes | Yes | - | **STATEMENT** |
| **Safe** | **ROW** | Yes | Yes | - | **ROW** |
| **Unsafe** | **STATEMENT** | Yes | Yes | Warning: Unsafe statement binlogged in statement format since **BINLOG\_FORMAT = STATEMENT**. | **STATEMENT** |
| **Unsafe** | **MIXED** | Yes | Yes | - | **ROW** |
| **Unsafe** | **ROW** | Yes | Yes | - | **ROW** |
| **Row Injection** | **STATEMENT** | Yes | Yes | Error: Cannot execute row injection: Binary logging is not possible because **BINLOG\_FORMAT = STATEMENT**. | - |
| **Row Injection** | **MIXED** | Yes | Yes | - | **ROW** |
| **Row Injection** | **ROW** | Yes | Yes | - | **ROW** |

When a warning is produced by the determination, a standard MySQL warning is produced (and is available using [**SHOW WARNINGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings)). The information is also written to the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) error log. Only one error for each error instance per client connection is logged to prevent flooding the log. The log message includes the SQL statement that was attempted.

If a replica has [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) set to display warnings, the replica prints messages to the error log to provide information about its status, such as the binary log and relay log coordinates where it starts its job, when it is switching to another relay log, when it reconnects after a disconnect, statements that are unsafe for statement-based logging, and so forth.

#### 5.4.4.4 Logging Format for Changes to mysql Database Tables

The contents of the grant tables in the **mysql** database can be modified directly (for example, with [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert) or [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete)) or indirectly (for example, with [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant) or [**CREATE USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-user)). Statements that affect **mysql** database tables are written to the binary log using the following rules:

* Data manipulation statements that change data in **mysql** database tables directly are logged according to the setting of the [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) system variable. This pertains to statements such as [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update), [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete), [**REPLACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#replace), [**DO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#do), [**LOAD DATA**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#load-data), [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select), and [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table).
* Statements that change the **mysql** database indirectly are logged as statements regardless of the value of [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format). This pertains to statements such as [**GRANT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#grant), [**REVOKE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#revoke), [**SET PASSWORD**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-password), [**RENAME USER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#rename-user), **CREATE** (all forms except [**CREATE TABLE ... SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table)), **ALTER** (all forms), and **DROP** (all forms).

[**CREATE TABLE ... SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) is a combination of data definition and data manipulation. The [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) part is logged using statement format and the [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) part is logged according to the value of [**binlog\_format**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format).

#### 5.4.4.5 Binary Log Transaction Compression

From MySQL 8.0.20, you can enable binary log transaction compression on a MySQL server instance. When binary log transaction compression is enabled, transaction payloads are compressed using the zstd algorithm, and then written to the server's binary log file as a single event (a **Transaction\_payload\_event**). Compressed transaction payloads remain in a compressed state while they are sent in the replication stream to replicas, other Group Replication group members, or clients such as [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog). They are not decompressed by receiver threads, and are written to the relay log still in their compressed state. Binary log transaction compression therefore saves storage space both on the originator of the transaction and on the recipient (and for their backups), and saves network bandwidth when the transactions are sent between server instances.

Compressed transaction payloads are decompressed when the individual events contained in them need to be inspected. For example, the **Transaction\_payload\_event** is decompressed by an applier thread in order to apply the events it contains on the recipient. Decompression is also carried out during recovery, by [**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) when replaying transactions, and by the [**SHOW BINLOG EVENTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-binlog-events) and [**SHOW RELAYLOG EVENTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-relaylog-events) statements.

You can enable binary log transaction compression on a MySQL server instance using the [**binlog\_transaction\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression) system variable, which defaults to **OFF**. You can also use the [**binlog\_transaction\_compression\_level\_zstd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression_level_zstd) system variable to set the level for the zstd algorithm that is used for compression. This value determines the compression effort, from 1 (the lowest effort) to 22 (the highest effort). As the compression level increases, the compression ratio increases, which reduces the storage space and network bandwidth required for the transaction payload. However, the effort required for data compression also increases, taking time and CPU and memory resources on the originating server. Increases in the compression effort do not have a linear relationship to increases in the compression ratio.

The following types of event are excluded from binary log transaction compression, so are always written uncompressed to the binary log:

* Events relating to the GTID for the transaction (including anonymous GTID events).
* Other types of control event, such as view change events and heartbeat events.
* Incident events and the whole of any transactions that contain them.
* Non-transactional events and the whole of any transactions that contain them. A transaction involving a mix of non-transactional and transactional storage engines does not have its payload compressed.
* Events that are logged using statement-based binary logging. Binary log transaction compression is only applied for the row-based binary logging format.

Binary log encryption can be used on binary log files that contain compressed transactions.

##### 5.4.4.5.1 Behaviors When Binary Log Transaction Compression is Enabled

Transactions with payloads that are compressed can be rolled back like any other transaction, and they can also be filtered out on a replica by the usual filtering options. Binary log transaction compression can be applied to XA transactions.

When binary log transaction compression is enabled, the [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) and [**slave\_max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_max_allowed_packet) limits for the server still apply, and are measured on the compressed size of the **Transaction\_payload\_event**, plus the bytes used for the event header. Note that compressed transaction payloads are sent as a single packet, rather than each event of the transaction being sent in an individual packet, as is the case when binary log transaction compression is not in use.

For multithreaded workers, each transaction (including its GTID event and **Transaction\_payload\_event**) is assigned to a worker thread. The worker thread decompresses the transaction payload and applies the individual events in it one by one. If an error is found applying any event within the **Transaction\_payload\_event**, the complete transaction is reported to the co-ordinator as having failed. When [**slave\_parallel\_type**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_type) is set to **DATABASE**, all the databases affected by the transaction are mapped before the transaction is scheduled. The use of binary log transaction compression with the **DATABASE** policy can reduce parallelism compared to uncompressed transactions, which are mapped and scheduled for each event.

For semisynchronous replication (see [Section 17.4.10, “Semisynchronous Replication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-semisync)), the replica acknowledges the transaction when the complete **Transaction\_payload\_event** has been received.

When binary log checksums are enabled (which is the default), the replication source server does not write checksums for individual events in a compressed transaction payload. Instead, a checksum is written for the complete **Transaction\_payload\_event**, and indivdual checksums are written for any events that were not compressed, such as events relating to GTIDs.

For the [**SHOW BINLOG EVENTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-binlog-events) and [**SHOW RELAYLOG EVENTS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-relaylog-events) statements, the **Transaction\_payload\_event** is first printed as a single unit, then it is unpacked and each event inside it is printed.

For operations that reference the end position of an event, such as [**START REPLICA | SLAVE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#start-replica) with the **UNTIL** clause, [**MASTER\_POS\_WAIT()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_master-pos-wait), and [**sql\_slave\_skip\_counter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_slave_skip_counter), you must specify the end position of the compressed transaction payload (the **Transaction\_payload\_event**). When skipping events using [**sql\_slave\_skip\_counter**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_sql_slave_skip_counter), a compressed transaction payload is counted as a single counter value, so all the events inside it are skipped as a unit.

##### 5.4.4.5.2 Combining Compressed and Uncompressed Transaction Payloads

MySQL Server releases that support binary log transaction compression can handle a mix of compressed and uncompressed transaction payloads.

* The system variables relating to binary log transaction compression do not need to be set the same on all Group Replication group members, and are not replicated from sources to replicas in a replication topology. You can decide whether or not binary log transaction compression is appropriate for each MySQL Server instance that has a binary log.
* If transaction compression is enabled then disabled on a server, compression is not applied to future transactions originated on that server, but transaction payloads that have been compressed can still be handled and displayed.
* If transaction compression is specified for individual sessions by setting the session value of [**binlog\_transaction\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression), the binary log can contain a mix of compressed and uncompressed transaction payloads.

When a source in a replication topology and its replica both have binary log transaction compression enabled, the replica receives compressed transaction payloads and writes them compressed to its relay log. It decompresses the transaction payloads to apply the transactions, and then compresses them again after applying for writing to its binary log. Any downstream replicas receive the compressed transaction payloads.

When a source in a replication topology has binary log transaction compression enabled but its replica does not, the replica receives compressed transaction payloads and writes them compressed to its relay log. It decompresses the transaction payloads to apply the transactions, and then writes them uncompressed to its own binary log, if it has one. Any downstream replicas receive the uncompressed transaction payloads.

When a source in a replication topology does not have binary log transaction compression enabled but its replica does, if the replica has a binary log, it compresses the transaction payloads after applying them, and writes the compressed transaction payloads to its binary log. Any downstream replicas receive the compressed transaction payloads.

When a MySQL server instance has no binary log, if it is at a release from MySQL 8.0.20, it can receive, handle, and display compressed transaction payloads regardless of its value for [**binlog\_transaction\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_transaction_compression). Compressed transaction payloads received by such server instances are written in their compressed state to the relay log, so they benefit indirectly from compression that was carried out by other servers in the replication topology.

A replica at a release before MySQL 8.0.20 cannot replicate from a source with binary log transaction compression enabled. A replica at or above MySQL 8.0.20 can replicate from a source at an earlier release that does not support binary log transaction compression, and can carry out its own compression on transactions received from that source when writing them to its own binary log.

##### 5.4.4.5.3 Monitoring Binary Log Transaction Compression

You can monitor the effects of binary log transaction compression using the Performance Schema table [**binary\_log\_transaction\_compression\_stats**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-binary-log-transaction-compression-stats-table). The statistics include the data compression ratio for the monitored period, and you can also view the effect of compression on the last transaction on the server. You can reset the statistics by truncating the table. Statistics for binary logs and relay logs are split out so you can see the impact of compression for each log type. The MySQL server instance must have a binary log to produce these statistics.

The Performance Schema table [**events\_stages\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-current-table) shows when a transaction is in the stage of decompression or compression for its transaction payload, and displays its progress for this stage. Compression is carried out by the worker thread handling the transaction, just before the transaction is committed, provided that there are no events in the finalized capture cache that exclude the transaction from binary log transaction compression (for example, incident events). When decompression is required, it is carried out for one event from the payload at a time.

[**mysqlbinlog**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog) with the [--verbose](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_mysqlbinlog_verbose) option includes comments stating the compressed size and the uncompressed size for compressed transaction payloads, and the compression algorithm that was used.

You can enable connection compression at the protocol level for replication connections, using the **SOURCE\_COMPRESSION\_ALGORITHMS** | **MASTER\_COMPRESSION\_ALGORITHMS** and **SOURCE\_ZSTD\_COMPRESSION\_LEVEL** | **MASTER\_ZSTD\_COMPRESSION\_LEVEL**options of the [**CHANGE REPLICATION SOURCE TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-replication-source-to) statement (from MySQL 8.0.23) or [**CHANGE MASTER TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-master-to) statement (before MySQL 8.0.23), or the deprecated [**slave\_compressed\_protocol**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_compressed_protocol) system variable. If you enable binary log transaction compression in a system where connection compression is also enabled, the impact of connection compression is reduced, as there might be little opportunity to further compress the compressed transaction payloads. However, connection compression can still operate on uncompressed events and on message headers. Binary log transaction compression can be enabled in combination with connection compression if you need to save storage space as well as network bandwidth. For more information on connection compression for replication connections, see [Section 4.2.8, “Connection Compression Control”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#connection-compression-control).

For Group Replication, compression is enabled by default for messages that exceed the threshold set by the [**group\_replication\_compression\_threshold**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_compression_threshold) system variable. You can also configure compression for messages sent for distributed recovery by the method of state transfer from a donor's binary log, using the [**group\_replication\_recovery\_compression\_algorithms**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_compression_algorithms) and [**group\_replication\_recovery\_zstd\_compression\_level**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#sysvar_group_replication_recovery_zstd_compression_level) system variables. If you enable binary log transaction compression in a system where these are configured, Group Replication's message compression can still operate on uncompressed events and on message headers, but its impact is reduced. For more information on message compression for Group Replication, see [Section 18.7.3, “Message Compression”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#group-replication-message-compression).

### 5.4.5 The Slow Query Log

The slow query log consists of SQL statements that take more than [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) seconds to execute and require at least [**min\_examined\_row\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_min_examined_row_limit) rows to be examined. The slow query log can be used to find queries that take a long time to execute and are therefore candidates for optimization. However, examining a long slow query log can be a time-consuming task. To make this easier, you can use the [**mysqldumpslow**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldumpslow) command to process a slow query log file and summarize its contents. See [Section 4.6.10, “mysqldumpslow — Summarize Slow Query Log Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldumpslow).

The time to acquire the initial locks is not counted as execution time. [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) writes a statement to the slow query log after it has been executed and after all locks have been released, so log order might differ from execution order.

* [Slow Query Log Parameters](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log-parameters)
* [Slow Query Log Contents](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log-contents)

#### Slow Query Log Parameters

The minimum and default values of [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) are 0 and 10, respectively. The value can be specified to a resolution of microseconds.

By default, administrative statements are not logged, nor are queries that do not use indexes for lookups. This behavior can be changed using [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) and [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes), as described later.

By default, the slow query log is disabled. To specify the initial slow query log state explicitly, use [--slow\_query\_log[={0|1}]](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log). With no argument or an argument of 1, [--slow\_query\_log](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) enables the log. With an argument of 0, this option disables the log. To specify a log file name, use [--slow\_query\_log\_file=***file\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file). To specify the log destination, use the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable (as described in [Section 5.4.1, “Selecting General Query Log and Slow Query Log Output Destinations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations)).

**Note**

If you specify the **TABLE** log destination, see [Log Tables and “Too many open files” Errors](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#log-destinations-tables-open-files).

If you specify no name for the slow query log file, the default name is ***host\_name***-slow.log. The server creates the file in the data directory unless an absolute path name is given to specify a different directory.

To disable or enable the slow query log or change the log file name at runtime, use the global [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) and [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) system variables. Set [**slow\_query\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log) to 0 to disable the log or to 1 to enable it. Set [**slow\_query\_log\_file**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_slow_query_log_file) to specify the name of the log file. If a log file already is open, it is closed and the new file is opened.

The server writes less information to the slow query log if you use the [--log-short-format](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-short-format) option.

To include slow administrative statements in the slow query log, enable the [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) system variable. Administrative statements include [**ALTER TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#alter-table), [**ANALYZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#analyze-table), [**CHECK TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#check-table), [**CREATE INDEX**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-index), [**DROP INDEX**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-index), [**OPTIMIZE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#optimize-table), and [**REPAIR TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#repair-table).

To include queries that do not use indexes for row lookups in the statements written to the slow query log, enable the [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) system variable. (Even with that variable enabled, the server does not log queries that would not benefit from the presence of an index due to the table having fewer than two rows.)

When queries that do not use an index are logged, the slow query log may grow quickly. It is possible to put a rate limit on these queries by setting the [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) system variable. By default, this variable is 0, which means there is no limit. Positive values impose a per-minute limit on logging of queries that do not use indexes. The first such query opens a 60-second window within which the server logs queries up to the given limit, then suppresses additional queries. If there are suppressed queries when the window ends, the server logs a summary that indicates how many there were and the aggregate time spent in them. The next 60-second window begins when the server logs the next query that does not use indexes.

The server uses the controlling parameters in the following order to determine whether to write a query to the slow query log:

1. The query must either not be an administrative statement, or [**log\_slow\_admin\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_admin_statements) must be enabled.
2. The query must have taken at least [**long\_query\_time**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_long_query_time) seconds, or [**log\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_queries_not_using_indexes) must be enabled and the query used no indexes for row lookups.
3. The query must have examined at least [**min\_examined\_row\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_min_examined_row_limit) rows.
4. The query must not be suppressed according to the [**log\_throttle\_queries\_not\_using\_indexes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_throttle_queries_not_using_indexes) setting.

The [**log\_timestamps**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_timestamps) system variable controls the time zone of timestamps in messages written to the slow query log file (as well as to the general query log file and the error log). It does not affect the time zone of general query log and slow query log messages written to log tables, but rows retrieved from those tables can be converted from the local system time zone to any desired time zone with [**CONVERT\_TZ()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_convert-tz) or by setting the session [**time\_zone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_time_zone) system variable.

By default, a replica does not write replicated queries to the slow query log. To change this, enable the [**log\_slow\_slave\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slow_slave_statements) system variable. Note that if row-based replication is in use ([**binlog\_format=ROW**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format)), [**log\_slow\_slave\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slow_slave_statements) has no effect. Queries are only added to the replica's slow query log when they are logged in statement format in the binary log, that is, when [**binlog\_format=STATEMENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) is set, or when [**binlog\_format=MIXED**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) is set and the statement is logged in statement format. Slow queries that are logged in row format when [**binlog\_format=MIXED**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) is set, or that are logged when [**binlog\_format=ROW**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_format) is set, are not added to the replica's slow query log, even if [**log\_slow\_slave\_statements**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_log_slow_slave_statements) is enabled.

#### Slow Query Log Contents

When the slow query log is enabled, the server writes output to any destinations specified by the [**log\_output**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_output) system variable. If you enable the log, the server opens the log file and writes startup messages to it. However, further logging of queries to the file does not occur unless the **FILE** log destination is selected. If the destination is **NONE**, the server writes no queries even if the slow query log is enabled. Setting the log file name has no effect on logging if **FILE** is not selected as an output destination.

If the slow query log is enabled and **FILE** is selected as an output destination, each statement written to the log is preceded by a line that begins with a **#** character and has these fields (with all fields on a single line):

* **Query\_time: *duration***

The statement execution time in seconds.

* **Lock\_time: *duration***

The time to acquire locks in seconds.

* **Rows\_sent: *N***

The number of rows sent to the client.

* **Rows\_examined:**

The number of rows examined by the server layer (not counting any processing internal to storage engines).

Enabling the [**log\_slow\_extra**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_extra) system variable (available as of MySQL 8.0.14) causes the server to write the following extra fields to **FILE** output in addition to those just listed (**TABLE** output is unaffected). Some field descriptions refer to status variable names. Consult the status variable descriptions for more information. However, in the slow query log, the counters are per-statement values, not cumulative per-session values.

* **Thread\_id: *ID***

The statement thread identifier.

* **Errno: *error\_number***

The statement error number, or 0 if no error occurred.

* **Killed: *N***

If the statement was terminated, the error number indicating why, or 0 if the statement terminated normally.

* **Bytes\_received: *N***

The [**Bytes\_received**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Bytes_received) value for the statement.

* **Bytes\_sent: *N***

The [**Bytes\_sent**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Bytes_sent) value for the statement.

* **Read\_first: *N***

The [**Handler\_read\_first**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_first) value for the statement.

* **Read\_last: *N***

The [**Handler\_read\_last**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_last) value for the statement.

* **Read\_key: *N***

The [**Handler\_read\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_key) value for the statement.

* **Read\_next: *N***

The [**Handler\_read\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_next) value for the statement.

* **Read\_prev: *N***

The [**Handler\_read\_prev**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_prev) value for the statement.

* **Read\_rnd: *N***

The [**Handler\_read\_rnd**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_rnd) value for the statement.

* **Read\_rnd\_next: *N***

The [**Handler\_read\_rnd\_next**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Handler_read_rnd_next) value for the statement.

* **Sort\_merge\_passes: *N***

The [**Sort\_merge\_passes**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_merge_passes) value for the statement.

* **Sort\_range\_count: *N***

The [**Sort\_range**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_range) value for the statement.

* **Sort\_rows: *N***

The [**Sort\_rows**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_rows) value for the statement.

* **Sort\_scan\_count: *N***

The [**Sort\_scan**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Sort_scan) value for the statement.

* **Created\_tmp\_disk\_tables: *N***

The [**Created\_tmp\_disk\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_disk_tables) value for the statement.

* **Created\_tmp\_tables: *N***

The [**Created\_tmp\_tables**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Created_tmp_tables) value for the statement.

* **Start: *timestamp***

The statement execution start time.

* **End: *timestamp***

The statement execution end time.

A given slow query log file may contain a mix of lines with and without the extra fields added by enabling [**log\_slow\_extra**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_slow_extra). Log file analyzers can determine whether a line contains the additional fields by the field count.

Each statement written to the slow query log file is preceded by a [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#set-variable) statement that includes a timestamp. As of MySQL 8.0.14, the timestamp indicates when the slow statement began executing. Prior to 8.0.14, the timestamp indicates when the slow statement was logged (which occurs after the statement finishes executing).

Passwords in statements written to the slow query log are rewritten by the server not to occur literally in plain text. See [Section 6.1.2.3, “Passwords and Logging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#password-logging).

### 5.4.6 Server Log Maintenance

As described in [Section 5.4, “MySQL Server Logs”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-logs), MySQL Server can create several different log files to help you see what activity is taking place. However, you must clean up these files regularly to ensure that the logs do not take up too much disk space.

When using MySQL with logging enabled, you may want to back up and remove old log files from time to time and tell MySQL to start logging to new files. See [Section 7.2, “Database Backup Methods”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\backup-and-recovery.html#backup-methods).

On a Linux (Red Hat) installation, you can use the **mysql-log-rotate** script for log maintenance. If you installed MySQL from an RPM distribution, this script should have been installed automatically. Be careful with this script if you are using the binary log for replication. You should not remove binary logs until you are certain that their contents have been processed by all replicas.

On other systems, you must install a short script yourself that you start from **cron** (or its equivalent) for handling log files.

Binary log files are automatically removed after the server's binary log expiration period. Removal of the files can take place at startup and when the binary log is flushed. The default binary log expiration period is 30 days. To specify an alternative expiration period, use the [**binlog\_expire\_logs\_seconds**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_binlog_expire_logs_seconds) system variable. If you are using replication, you should specify an expiration period that is no lower than the maximum amount of time your replicas might lag behind the source. To remove binary logs on demand, use the [**PURGE BINARY LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#purge-binary-logs) statement (see [Section 13.4.1.1, “PURGE BINARY LOGS Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#purge-binary-logs)).

To force MySQL to start using new log files, flush the logs. Log flushing occurs when you execute a [**FLUSH LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-logs) statement or a [**mysqladmin flush-logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin), [**mysqladmin refresh**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin), [**mysqldump --flush-logs**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump), or [**mysqldump --master-data**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump) command. See [Section 13.7.8.3, “FLUSH Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush), [Section 4.5.2, “mysqladmin — A MySQL Server Administration Program”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin), and [Section 4.5.4, “mysqldump — A Database Backup Program”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqldump). In addition, the server flushes the binary log automatically when current binary log file size reaches the value of the [**max\_binlog\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_max_binlog_size) system variable.

[**FLUSH LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-logs) supports optional modifiers to enable selective flushing of individual logs (for example, [**FLUSH BINARY LOGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush-binary-logs)). See [Section 13.7.8.3, “FLUSH Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#flush).

A log-flushing operation has the following effects:

* If binary logging is enabled, the server closes the current binary log file and opens a new log file with the next sequence number.
* If general query logging or slow query logging to a log file is enabled, the server closes and reopens the log file.
* If the server was started with the [--log-error](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_log-error) option to cause the error log to be written to a file, the server closes and reopens the log file.

Execution of log-flushing statements or commands requires connecting to the server using an account that has the [**RELOAD**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_reload) privilege. On Unix and Unix-like systems, another way to flush the logs is to send a signal to the server, which can be done by **root** or the account that owns the server process. (See [Section 4.10, “Unix Signal Handling in MySQL”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#unix-signal-response).) Signals enable log flushing to be performed without having to connect to the server:

* A **SIGHUP** signal flushes all the logs. However, **SIGHUP** has additional effects other than log flushing that might be undesirable.
* As of MySQL 8.0.19, **SIGUSR1** causes the server to flush the error log, general query log, and slow query log. If you are interested in flushing only those logs, **SIGUSR1** can be used as a more “lightweight” signal that does not have the **SIGHUP** effects that are unrelated to logs.

As mentioned previously, flushing the binary log creates a new binary log file, whereas flushing the general query log, slow query log, or error log just closes and reopens the log file. For the latter logs, to cause a new log file to be created on Unix, rename the current log file first before flushing it. At flush time, the server opens the new log file with the original name. For example, if the general query log, slow query log, and error log files are named mysql.log, mysql-slow.log, and err.log, you can use a series of commands like this from the command line:

cd ***mysql-data-directory***

mv mysql.log mysql.log.old

mv mysql-slow.log mysql-slow.log.old

mv err.log err.log.old

mysqladmin flush-logs

On Windows, use **rename** rather than **mv**.

At this point, you can make a backup of mysql.log.old, mysql-slow.log.old, and err.log.old, then remove them from disk.

To rename the general query log or slow query log at runtime, first connect to the server and disable the log:

SET GLOBAL general\_log = 'OFF';

SET GLOBAL slow\_query\_log = 'OFF';

With the logs disabled, rename the log files externally (for example, from the command line). Then enable the logs again:

SET GLOBAL general\_log = 'ON';

SET GLOBAL slow\_query\_log = 'ON';

This method works on any platform and does not require a server restart.

**Note**

For the server to recreate a given log file after you have renamed the file externally, the file location must be writable by the server. This may not always be the case. For example, on Linux, the server might write the error log as /var/log/mysqld.log, where /var/log is owned by **root** and not writable by [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld). In this case, log-flushing operations fail to create a new log file.

To handle this situation, you must manually create the new log file with the proper ownership after renaming the original log file. For example, execute these commands as **root**:

mv /var/log/mysqld.log /var/log/mysqld.log.old

install -omysql -gmysql -m0644 /dev/null /var/log/mysqld.log

## 5.5 MySQL组件

5.5.1 安装和卸载组件

5.5.2 获取组件信息

5.5.3 错误日志组件

5.5.4 查询属性组件

MySQL服务器包括一个基于组件的基础设施，用于扩展服务器功能。一个组件提供对服务器和其他组件可用的服务。在服务使用方面，服务器是一个组件，与其他组件平等。组件之间只通过它们提供的服务进行交互。

MySQL发行版包括几个实现服务器扩展的组件。

- 用于配置错误日志的组件。见第5.4.2节 "错误日志"，和第5.5.3节 "错误日志组件"。

- 一个用于检查密码的组件。见第6.4.3节，"密码验证组件"。

- 钥匙圈组件为敏感信息提供安全存储。见第6.4.4节，"MySQL钥匙圈"。

- 一个组件，使应用程序能够将他们自己的消息事件添加到审计日志中。见第6.4.6节，"审计消息组件"。

- 一个组件，实现了访问查询属性的可加载函数。参见第9.6节，"查询属性"。

由组件实现的系统和状态变量在组件安装时被暴露出来，其名称以组件特有的前缀开始。例如，log\_filter\_dragnet 错误日志过滤器组件实现了一个名为 log\_error\_filter\_rules 的系统变量，其全名是 dragnet.log\_error\_filter\_rules。要引用这个变量，请使用全名。

下面几节描述了如何安装和卸载组件，以及如何在运行时确定哪些组件已被安装并获取它们的信息。

关于组件的内部实现的信息，请参阅MySQL Server Doxygen文档，可在https://dev.mysql.com/doc/index-other.html。例如，如果你打算编写你自己的组件，这些信息对于理解组件的工作方式很重要。

### 5.5.1 Installing and Uninstalling Components

Components must be loaded into the server before they can be used. MySQL supports manual component loading at runtime and automatic loading during server startup.

While a component is loaded, information about it is available as described in [Section 5.5.2, “Obtaining Component Information”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-component-information).

The [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) and [**UNINSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-component) SQL statements enable component loading and unloading. For example:

INSTALL COMPONENT 'file://component\_validate\_password';

UNINSTALL COMPONENT 'file://component\_validate\_password';

A loader service handles component loading and unloading, and also registers loaded components in the **mysql.component** system table.

The SQL statements for component manipulation affect server operation and the **mysql.component** system table as follows:

* [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) loads components into the server. The components become active immediately. The loader service also registers loaded components in the **mysql.component** system table. For subsequent server restarts, the loader service loads any components listed in **mysql.component** during the startup sequence. This occurs even if the server is started with the [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) option.
* [**UNINSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-component) deactivates components and unloads them from the server. The loader service also unregisters the components from the **mysql.component** system table so that the server no longer loads them during its startup sequence for subsequent restarts.

Compared to the corresponding [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) statement for server plugins, the [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) statement for components offers the significant advantage that it is not necessary to know any platform-specific file name suffix for naming the component. This means that a given [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) statement can be executed uniformly across platforms.

A component when installed may also automatically install related loadable functions. If so, the component when uninstalled also automatically uninstalls those functions.

### 5.5.2 Obtaining Component Information

The **mysql.component** sytem table contains information about currently loaded components and shows which components have been registered using [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component). Selecting from the table shows which components are installed. For example:

mysql> **SELECT \* FROM mysql.component;**

+--------------+--------------------+------------------------------------+

| component\_id | component\_group\_id | component\_urn |

+--------------+--------------------+------------------------------------+

| 1 | 1 | file://component\_validate\_password |

| 2 | 2 | file://component\_log\_sink\_json |

+--------------+--------------------+------------------------------------+

The **component\_id** and **component\_group\_id** values are for internal use. The **component\_urn** is the URN used in [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) and [**UNINSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-component) statements to load and unload the component.

### 5.5.3 Error Log Components

This section describes the characteristics of individual error log components. For general information about configuring error logging, see [Section 5.4.2, “The Error Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log).

A log component can be a filter or a sink:

* A filter processes log events, to add, remove, or modify event fields, or to delete events entirely. The resulting events pass to the next log component in the list of enabled components.
* A sink is a destination (writer) for log events. Typically, a sink processes log events into log messages that have a particular format and writes these messages to its associated output, such as a file or the system log. A sink may also write to the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table; see [Section 27.12.21.1, “The error\_log Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table). Events pass unmodified to the next log component in the list of enabled components (that is, although a sink formats events to produce output messages, it does not modify events as they pass internally to the next component).

The [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) system variable value lists the enabled log components. Components not named in the list are disabled.

The following sections describe individual log components, grouped by component type:

* [Filter Error Log Components](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-filter-components)
* [Sink Error Log Components](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-sink-components)

Component descriptions include these types of information:

* The component name and intended purpose.
* Whether the component is built in or must be loaded. For a loadable component, the description specifies the URN to use to load and unload the component with the [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) and [**UNINSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-component) statements.
* Whether the component can be listed multiple times in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value.
* For a sink component, the destination to which the component writes output.
* For a sink component, whether it supports an interface to the Performance Schema [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table.

#### Filter Error Log Components

Error log filter components implement filtering of error log events. If no filter component is enabled, no filtering occurs.

Any enabled filter component affects log events only for components listed later in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value. In particular, for any log sink component listed in [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) earlier than any filter component, no log event filtering occurs.

##### The log\_filter\_internal Component

* Purpose: Implements filtering based on log event priority and error code, in combination with the [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) system variables. See [Section 5.4.2.5, “Priority-Based Error Log Filtering (log\_filter\_internal)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-priority-based-filtering).
* URN: This component is built in and need not be loaded with [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) before use.
* Multiple uses permitted: No.

If **log\_filter\_internal** is disabled, [**log\_error\_verbosity**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_verbosity) and [**log\_error\_suppression\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_suppression_list) have no effect.

##### The log\_filter\_dragnet Component

* Purpose: Implements filtering based on the rules defined by the [**dragnet.log\_error\_filter\_rules**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_dragnet.log_error_filter_rules) system variable setting. See [Section 5.4.2.6, “Rule-Based Error Log Filtering (log\_filter\_dragnet)”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-rule-based-filtering).
* URN: **file://component\_log\_filter\_dragnet**
* Multiple uses permitted: No.

#### Sink Error Log Components

Error log sink components are writers that implement error log output. If no sink component is enabled, no log output occurs.

Some sink component descriptions refer to the default error log destination. This is the console or a file and is indicated by the value of the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable, determined as described in [Section 5.4.2.2, “Default Error Log Destination Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-destination-configuration).

##### The log\_sink\_internal Component

* Purpose: Implements traditional error log message output format.
* URN: This component is built in and need not be loaded with [**INSTALL COMPONENT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-component) before use.
* Multiple uses permitted: No.
* Output destination: Writes to the default error log destination.
* Performance Schema support: Writes to the [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table. Provides a parser for reading error log files created by previous server instances.

##### The log\_sink\_json Component

* Purpose: Implements JSON-format error logging. See [Section 5.4.2.7, “Error Logging in JSON Format”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-json).
* URN: **file://component\_log\_sink\_json**
* Multiple uses permitted: Yes.
* Output destination: This sink determines its output destination based on the default error log destination, which is given by the [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) system variable:
  + If [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) names a file, the sink bases output file naming on that file name, plus a numbered .***NN***.json suffix, with ***NN*** starting at 00. For example, if [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) is ***file\_name***, successive instances of **log\_sink\_json** named in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value write to ***file\_name***.00.json, ***file\_name***.01.json, and so forth.
  + If [**log\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error) is **stderr**, the sink writes to the console. If **log\_sink\_json** is named multiple times in the [**log\_error\_services**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_log_error_services) value, they all write to the console, which is likely not useful.
* Performance Schema support: Writes to the [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table. Provides a parser for reading error log files created by previous server instances.

##### The log\_sink\_syseventlog Component

* Purpose: Implements error logging to the system log. This is the Event Log on Windows, and **syslog** on Unix and Unix-like systems. See [Section 5.4.2.8, “Error Logging to the System Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log-syslog).
* URN: **file://component\_log\_sink\_syseventlog**
* Multiple uses permitted: No.
* Output destination: Writes to the system log. Does not use the default error log destination.
* Performance Schema support: Does not write to the [**error\_log**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-error-log-table) table. Does not provide a parser for reading error log files created by previous server instances.

##### The log\_sink\_test Component

* Purpose: Intended for internal use in writing test cases, not for production use.
* URN: **file://component\_log\_sink\_test**

Sink properties such as whether multiple uses are permitted and the output destination are not specified for **log\_sink\_test** because, as mentioned, it is for internal use. As such, its behavior is subject to change at any time.

### 5.5.4 Query Attribute Components

As of MySQL 8.0.23, a a component service provides access to query attributes (see [Section 9.6, “Query Attributes”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\language-structure.html#query-attributes)). The **query\_attributes** component uses this service to provide access to query attributes within SQL statements.

* Purpose: Implements the [**mysql\_query\_attribute\_string()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\language-structure.html#function_mysql-query-attribute-string) function that takes an attribute name argument and returns the attribute value as a string, or **NULL** if the attribute does not exist.
* URN: **file://component\_query\_attributes**

Developers who wish to incorporate the same query-attribute component service used by **query\_attributes** should consult the mysql\_query\_attributes.h file in a MySQL source distribution.

## 5.6 MySQL服务器插件

5.6.1 安装和卸载插件

5.6.2 获取服务器插件信息

5.6.3 MySQL企业线程池

5.6.4 重写器查询重写插件

5.6.5 ddl\_rewriter插件

5.6.6 版本令牌

5.6.7 克隆插件

5.6.8 Keyring代理桥插件

5.6.9 MySQL插件服务

MySQL支持一个插件API，可以创建服务器插件。插件可以在服务器启动时加载，也可以在运行时加载和卸载，而无需重新启动服务器。这个接口支持的插件包括但不限于存储引擎、INFORMATION\_SCHEMA表、全文分析器插件和服务器扩展。

MySQL发行版包括几个实现服务器扩展的插件。

- 用于验证客户端连接到MySQL服务器的尝试的插件。插件可用于几种认证协议。见第6.2.17节，"可插入的认证"。

- 一个连接控制插件，使管理员能够在客户机连接尝试连续失败一定次数后引入越来越多的延迟。参见第6.4.2节 "连接控制插件"。

- 一个密码验证插件实现了密码强度策略，并评估了潜在密码的强度。见第6.4.3节 "密码验证组件"。

- 半同步复制插件实现了复制能力的接口，只要至少有一个副本对每个事务做出响应，就允许源程序继续进行。参见第17.4.10节，"半同步复制"。

- 组复制使你能够在一组MySQL服务器实例中创建一个高可用的分布式MySQL服务，其数据一致性、冲突检测和解决以及组成员服务都是内置的。参见第18章，组复制。

- MySQL企业版包括一个线程池插件，它可以管理连接线程，通过有效管理大量客户端连接的语句执行线程来提高服务器性能。参见第5.6.3节，"MySQL企业版线程池"。

- MySQL企业版包括一个审计插件，用于监控和记录连接和查询活动。参见第6.4.5节，"MySQL企业审计"。

- MySQL企业版包括一个防火墙插件，该插件实现了应用级防火墙，使数据库管理员能够根据与所接受的语句模式的允许列表的匹配来允许或拒绝SQL语句的执行。见第6.4.7节，"MySQL企业版防火墙"。

- 查询重写插件检查MySQL服务器收到的语句，并可能在服务器执行前对其进行重写。参见第5.6.4节 "重写器查询重写插件"，以及第5.6.5节 "ddl\_rewriter插件"。

- 版本令牌能够创建和同步服务器令牌，应用程序可以使用这些令牌来防止访问不正确或过时的数据。版本令牌是基于一个插件库，它实现了一个version\_tokens插件和一组可加载函数。参见第5.6.6节，"版本标识"。

- 钥匙圈插件为敏感信息提供安全存储。见第6.4.4节，"MySQL钥匙圈"。

在MySQL 8.0.24中，MySQL Keyring开始从插件过渡到使用组件基础设施，使用名为daemon\_keyring\_proxy\_plugin的插件来促进，该插件充当插件和组件服务API之间的桥梁。见第5.6.8节，"钥匙圈代理桥接插件"。

- X Plugin扩展了MySQL Server，使其能够作为一个文档存储空间发挥作用。运行X Plugin使MySQL服务器能够使用X协议与客户进行通信，该协议旨在将MySQL的ACID兼容存储能力作为文件存储进行公开。参见第20.5节，"X插件"。

- 克隆允许从本地或远程MySQL服务器实例克隆InnoDB数据。参见第5.6.7节，"克隆插件"。

- 测试框架插件测试服务器服务。关于这些插件的信息，请参见MySQL服务器Doxygen文档的测试插件服务部分，可在https://dev.mysql.com/doc/index-other.html。

下面几节描述了如何安装和卸载插件，以及如何在运行时确定哪些插件被安装并获得有关它们的信息。关于编写插件的信息，请参阅《MySQL插件API》

### 5.6.1 Installing and Uninstalling Plugins

Server plugins must be loaded into the server before they can be used. MySQL supports plugin loading at server startup and runtime. It is also possible to control the activation state of loaded plugins at startup, and to unload them at runtime.

While a plugin is loaded, information about it is available as described in [Section 5.6.2, “Obtaining Server Plugin Information”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-plugin-information).

* [Installing Plugins](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-installing)
* [Controlling Plugin Activation State](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-activating)
* [Uninstalling Plugins](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-uninstalling)
* [Plugins and Loadable Functions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-loadable-function-installing)

#### Installing Plugins

Before a server plugin can be used, it must be installed using one of the following methods. In the descriptions, ***plugin\_name*** stands for a plugin name such as **innodb**, **csv**, or **validate\_password**.

* [Built-in Plugins](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-installing-built-in)
* [Plugins Registered in the mysql.plugin System Table](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-installing-system-table)
* [Plugins Named with Command-Line Options](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-installing-command-line)
* [Plugins Installed with the INSTALL PLUGIN Statement](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-installing-install-plugin)

##### Built-in Plugins

A built-in plugin is known by the server automatically. By default, the server enables the plugin at startup. Some built-in plugins permit this to be changed with the --***plugin\_name***[=***activation\_state***] option.

##### Plugins Registered in the mysql.plugin System Table

The **mysql.plugin** system table serves as a registry of plugins (other than built-in plugins, which need not be registered). During the normal startup sequence, the server loads plugins registered in the table. By default, for a plugin loaded from the **mysql.plugin** table, the server also enables the plugin. This can be changed with the --***plugin\_name***[=***activation\_state***] option.

If the server is started with the [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) option, plugins registered in the **mysql.plugin** table are not loaded and are unavailable.

##### Plugins Named with Command-Line Options

A plugin located in a plugin library file can be loaded at server startup with the [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), or [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) option. Normally, for a plugin loaded at startup, the server also enables the plugin. This can be changed with the --***plugin\_name***[=***activation\_state***] option.

The [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) and [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) options load plugins after built-in plugins and storage engines have initialized during the server startup sequence. The [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) option is used to load plugins that must be available prior to initialization of built-in plugins and storage engines.

The value of each plugin-loading option is a semicolon-separated list of ***plugin\_library*** and ***name*=*plugin\_library*** values. Each ***plugin\_library*** is the name of a library file that contains plugin code, and each ***name*** is the name of a plugin to load. If a plugin library is named without any preceding plugin name, the server loads all plugins in the library. With a preceding plugin name, the server loads only the named plugin from the libary. The server looks for plugin library files in the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable.

Plugin-loading options do not register any plugin in the **mysql.plugin** table. For subsequent restarts, the server loads the plugin again only if [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), or [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) is given again. That is, the option produces a one-time plugin-installation operation that persists for a single server invocation.

[--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), and [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) enable plugins to be loaded even when [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) is given (which causes the server to ignore the **mysql.plugin** table). [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), and [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) also enable plugins to be loaded at startup that cannot be loaded at runtime.

The [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option complements the [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) option:

* Each instance of [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) resets the set of plugins to load at startup, whereas [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) adds a plugin or plugins to the set of plugins to be loaded without resetting the current set. Consequently, if multiple instances of [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) are specified, only the last one applies. With multiple instances of [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), all of them apply.
* The argument format is the same as for [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), but multiple instances of [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) can be used to avoid specifying a large set of plugins as a single long unwieldy [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) argument.
* [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) can be given in the absence of [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), but any instance of [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) that appears before [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) has no effect because [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) resets the set of plugins to load.

For example, these options:

--plugin-load=x --plugin-load-add=y

are equivalent to these options:

--plugin-load-add=x --plugin-load-add=y

and are also equivalent to this option:

--plugin-load="x;y"

But these options:

--plugin-load-add=y --plugin-load=x

are equivalent to this option:

--plugin-load=x

##### Plugins Installed with the INSTALL PLUGIN Statement

A plugin located in a plugin library file can be loaded at runtime with the [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) statement. The statement also registers the plugin in the **mysql.plugin** table to cause the server to load it on subsequent restarts. For this reason, [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) requires the [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_insert) privilege for the **mysql.plugin** table.

The plugin library file base name depends on your platform. Common suffixes are .so for Unix and Unix-like systems, .dll for Windows.

Example: The [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option installs a plugin at server startup. To install a plugin named **myplugin** from a plugin library file named somepluglib.so, use these lines in a my.cnf file:

[mysqld]

plugin-load-add=myplugin=somepluglib.so

In this case, the plugin is not registered in **mysql.plugin**. Restarting the server without the [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option causes the plugin not to be loaded at startup.

Alternatively, the [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) statement causes the server to load the plugin code from the library file at runtime:

INSTALL PLUGIN myplugin SONAME 'somepluglib.so';

[**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) also causes “permanent” plugin registration: The plugin is listed in the **mysql.plugin** table to ensure that the server loads it on subsequent restarts.

Many plugins can be loaded either at server startup or at runtime. However, if a plugin is designed such that it must be loaded and initialized during server startup, attempts to load it at runtime using [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) produce an error:

mysql> **INSTALL PLUGIN myplugin SONAME 'somepluglib.so';**

ERROR 1721 (HY000): Plugin 'myplugin' is marked as not dynamically

installable. You have to stop the server to install it.

In this case, you must use [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), or [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load).

If a plugin is named both using a [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load), [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), or [--early-plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_early-plugin-load) option and (as a result of an earlier [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) statement) in the **mysql.plugin** table, the server starts but writes these messages to the error log:

[ERROR] Function '***plugin\_name***' already exists

[Warning] Couldn't load plugin named '***plugin\_name***'

with soname '***plugin\_object\_file***'.

#### Controlling Plugin Activation State

If the server knows about a plugin when it starts (for example, because the plugin is named using a [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option or is registered in the **mysql.plugin** table), the server loads and enables the plugin by default. It is possible to control activation state for such a plugin using a **--*plugin\_name*[=*activation\_state*]** startup option, where ***plugin\_name*** is the name of the plugin to affect, such as **innodb**, **csv**, or **validate\_password**. As with other options, dashes and underscores are interchangeable in option names. Also, activation state values are not case-sensitive. For example, --my\_plugin=ON and --my-plugin=on are equivalent.

* --***plugin\_name***=OFF

Tells the server to disable the plugin. This may not be possible for certain built-in plugins, such as **mysql\_native\_password**.

* --***plugin\_name***[=ON]

Tells the server to enable the plugin. (Specifying the option as --***plugin\_name*** without a value has the same effect.) If the plugin fails to initialize, the server runs with the plugin disabled.

* --***plugin\_name***=FORCE

Tells the server to enable the plugin, but if plugin initialization fails, the server does not start. In other words, this option forces the server to run with the plugin enabled or not at all.

* --***plugin\_name***=FORCE\_PLUS\_PERMANENT

Like **FORCE**, but in addition prevents the plugin from being unloaded at runtime. If a user attempts to do so with [**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin), an error occurs.

Plugin activation states are visible in the **LOAD\_OPTION** column of the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table.

Suppose that **CSV**, **BLACKHOLE**, and **ARCHIVE** are built-in pluggable storage engines and that you want the server to load them at startup, subject to these conditions: The server is permitted to run if **CSV** initialization fails, must require that **BLACKHOLE** initialization succeeds, and should disable **ARCHIVE**. To accomplish that, use these lines in an option file:

[mysqld]

csv=ON

blackhole=FORCE

archive=OFF

The --enable-***plugin\_name*** option format is a synonym for --***plugin\_name***=ON. The --disable-***plugin\_name*** and --skip-***plugin\_name*** option formats are synonyms for --***plugin\_name***=OFF.

If a plugin is disabled, either explicitly with **OFF** or implicitly because it was enabled with **ON** but fails to initialize, aspects of server operation requiring the plugin change. For example, if the plugin implements a storage engine, existing tables for the storage engine become inaccessible, and attempts to create new tables for the storage engine result in tables that use the default storage engine unless the [**NO\_ENGINE\_SUBSTITUTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sqlmode_no_engine_substitution) SQL mode is enabled to cause an error to occur instead.

Disabling a plugin may require adjustment to other options. For example, if you start the server using [--skip-innodb](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#option_mysqld_innodb) to disable [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html), other innodb\_***xxx*** options likely also need to be omitted at startup. In addition, because [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html) is the default storage engine, it cannot start unless you specify another available storage engine with [**--default\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_storage_engine). You must also set [**--default\_tmp\_storage\_engine**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_default_tmp_storage_engine).

#### Uninstalling Plugins

At runtime, the [**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin) statement disables and uninstalls a plugin known to the server. The statement unloads the plugin and removes it from the **mysql.plugin** system table, if it is registered there. For this reason, [**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin) statement requires the [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_delete) privilege for the **mysql.plugin** table. With the plugin no longer registered in the table, the server does not load the plugin during subsequent restarts.

[**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin) can unload a plugin regardless of whether it was loaded at runtime with [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) or at startup with a plugin-loading option, subject to these conditions:

* It cannot unload plugins that are built in to the server. These can be identified as those that have a library name of **NULL** in the output from [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) or [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins).
* It cannot unload plugins for which the server was started with --***plugin\_name***=FORCE\_PLUS\_PERMANENT, which prevents plugin unloading at runtime. These can be identified from the **LOAD\_OPTION** column of the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table.

To uninstall a plugin that currently is loaded at server startup with a plugin-loading option, use this procedure.

1. Remove from the my.cnf file any options and system variables related to the plugin. If any plugin system variables were persisted to the mysqld-auto.cnf file, remove them using [**RESET PERSIST *var\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#reset-persist) for each one to remove it.
2. Restart the server.
3. Plugins normally are installed using either a plugin-loading option at startup or with [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) at runtime, but not both. However, removing options for a plugin from the my.cnf file may not be sufficient to uninstall it if at some point [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) has also been used. If the plugin still appears in the output from [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) or [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins), use [**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin) to remove it from the **mysql.plugin** table. Then restart the server again.

#### Plugins and Loadable Functions

A plugin when installed may also automatically install related loadable functions. If so, the plugin when uninstalled also automatically uninstalls those functions.

### 5.6.2 Obtaining Server Plugin Information

There are several ways to determine which plugins are installed in the server:

* The [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table contains a row for each loaded plugin. Any that have a **PLUGIN\_LIBRARY** value of **NULL** are built in and cannot be unloaded.
* mysql> **SELECT \* FROM INFORMATION\_SCHEMA.PLUGINS\G**
* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
* PLUGIN\_NAME: binlog
* PLUGIN\_VERSION: 1.0
* PLUGIN\_STATUS: ACTIVE
* PLUGIN\_TYPE: STORAGE ENGINE
* PLUGIN\_TYPE\_VERSION: 50158.0
* PLUGIN\_LIBRARY: NULL
* PLUGIN\_LIBRARY\_VERSION: NULL
* PLUGIN\_AUTHOR: Oracle Corporation
* PLUGIN\_DESCRIPTION: This is a pseudo storage engine to represent the binlog in a transaction
* PLUGIN\_LICENSE: GPL
* LOAD\_OPTION: FORCE
* ...
* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 10. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
* PLUGIN\_NAME: InnoDB
* PLUGIN\_VERSION: 1.0
* PLUGIN\_STATUS: ACTIVE
* PLUGIN\_TYPE: STORAGE ENGINE
* PLUGIN\_TYPE\_VERSION: 50158.0
* PLUGIN\_LIBRARY: ha\_innodb\_plugin.so
* PLUGIN\_LIBRARY\_VERSION: 1.0
* PLUGIN\_AUTHOR: Oracle Corporation
* PLUGIN\_DESCRIPTION: Supports transactions, row-level locking,
* and foreign keys
* PLUGIN\_LICENSE: GPL
* LOAD\_OPTION: ON
* ...
* The [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement displays a row for each loaded plugin. Any that have a **Library** value of **NULL** are built in and cannot be unloaded.
* mysql> **SHOW PLUGINS\G**
* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
* Name: binlog
* Status: ACTIVE
* Type: STORAGE ENGINE
* Library: NULL
* License: GPL
* ...
* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 10. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
* Name: InnoDB
* Status: ACTIVE
* Type: STORAGE ENGINE
* Library: ha\_innodb\_plugin.so
* License: GPL
* ...
* The **mysql.plugin** table shows which plugins have been registered with [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin). The table contains only plugin names and library file names, so it does not provide as much information as the [**PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table or the [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement.

### 5.6.3 MySQL Enterprise Thread Pool

[5.6.3.1 Thread Pool Elements](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-elements)

[5.6.3.2 Thread Pool Installation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-installation)

[5.6.3.3 Thread Pool Operation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-operation)

[5.6.3.4 Thread Pool Tuning](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-tuning)

**Note**

MySQL Enterprise Thread Pool is an extension included in MySQL Enterprise Edition, a commercial product. To learn more about commercial products, <https://www.mysql.com/products/>.

MySQL Enterprise Edition includes MySQL Enterprise Thread Pool, implemented using a server plugin. The default thread-handling model in MySQL Server executes statements using one thread per client connection. As more clients connect to the server and execute statements, overall performance degrades. The thread pool plugin provides an alternative thread-handling model designed to reduce overhead and improve performance. The plugin implements a thread pool that increases server performance by efficiently managing statement execution threads for large numbers of client connections.

The thread pool addresses several problems of the model that uses one thread per connection:

* Too many thread stacks make CPU caches almost useless in highly parallel execution workloads. The thread pool promotes thread stack reuse to minimize the CPU cache footprint.
* With too many threads executing in parallel, context switching overhead is high. This also presents a challenge to the operating system scheduler. The thread pool controls the number of active threads to keep the parallelism within the MySQL server at a level that it can handle and that is appropriate for the server host on which MySQL is executing.
* Too many transactions executing in parallel increases resource contention. In [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html), this increases the time spent holding central mutexes. The thread pool controls when transactions start to ensure that not too many execute in parallel.

#### Additional Resources

[Section A.15, “MySQL 8.0 FAQ: MySQL Enterprise Thread Pool”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\faqs.html#faqs-thread-pool)

#### 5.6.3.1 Thread Pool Elements

MySQL Enterprise Thread Pool comprises these elements:

* A plugin library file implements a plugin for the thread pool code as well as several associated monitoring tables that provide information about thread pool operation:
  + As of MySQL 8.0.14, the monitoring tables are Performance Schema tables; see [Section 27.12.16, “Performance Schema Thread Pool Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-thread-pool-tables).
  + Prior to MySQL 8.0.14, the monitoring tables are **INFORMATION\_SCHEMA** tables; see [Section 26.5, “INFORMATION\_SCHEMA Thread Pool Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#thread-pool-information-schema-tables).

The **INFORMATION\_SCHEMA** tables now are deprecated; expect them to be removed in a future version of MySQL. Applications should transition away from the **INFORMATION\_SCHEMA** tables to the Performance Schema tables. For example, if an application uses this query:

SELECT \* FROM INFORMATION\_SCHEMA.TP\_THREAD\_STATE;

The application should use this query instead:

SELECT \* FROM performance\_schema.tp\_thread\_state;

* **Note**
* If you do not load all the monitoring tables, some or all MySQL Enterprise Monitor thread pool graphs may be empty.
* For a detailed description of how the thread pool works, see [Section 5.6.3.3, “Thread Pool Operation”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-operation).
* Several system variables are related to the thread pool. The [**thread\_handling**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_handling) system variable has a value of **loaded-dynamically** when the server successfully loads the thread pool plugin.

The other related system variables are implemented by the thread pool plugin and are not available unless it is enabled. For information about using these variables, see [Section 5.6.3.3, “Thread Pool Operation”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-operation), and [Section 5.6.3.4, “Thread Pool Tuning”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-tuning).

* The Performance Schema has instruments that expose information about the thread pool and may be used to investigate operational performance. To identify them, use this query:
* SELECT \* FROM performance\_schema.setup\_instruments
* WHERE NAME LIKE '%thread\_pool%';

For more information, see [Chapter 27, *MySQL Performance Schema*](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html).

#### 5.6.3.2 Thread Pool Installation

This section describes how to install MySQL Enterprise Thread Pool. For general information about installing plugins, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).

To be usable by the server, the plugin library file must be located in the MySQL plugin directory (the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable). If necessary, configure the plugin directory location by setting the value of [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) at server startup.

The plugin library file base name is **thread\_pool**. The file name suffix differs per platform (for example, .so for Unix and Unix-like systems, .dll for Windows).

* [Thread Pool Installation as of MySQL 8.0.14](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-installation-ps-tables)
* [Thread Pool Installation Prior to MySQL 8.0.14](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-installation-is-tables)

##### Thread Pool Installation as of MySQL 8.0.14

In MySQL 8.0.14 and higher, the thread pool monitoring tables are Performance Schema tables that are loaded and unloaded along with the thread pool plugin. The **INFORMATION\_SCHEMA** versions of the tables are deprecated but still available; they are installed per the instructions in [Thread Pool Installation Prior to MySQL 8.0.14](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-installation-is-tables).

To enable thread pool capability, load the plugin by starting the server with the [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option. To do this, put these lines in the server my.cnf file, adjusting the .so suffix for your platform as necessary:

[mysqld]

plugin-load-add=thread\_pool.so

To verify plugin installation, examine the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table or use the [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement (see [Section 5.6.2, “Obtaining Server Plugin Information”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-plugin-information)). For example:

mysql> **SELECT PLUGIN\_NAME, PLUGIN\_STATUS**

**FROM INFORMATION\_SCHEMA.PLUGINS**

**WHERE PLUGIN\_NAME LIKE 'thread%';**

+-----------------------+---------------+

| PLUGIN\_NAME | PLUGIN\_STATUS |

+-----------------------+---------------+

| thread\_pool | ACTIVE |

+-----------------------+---------------+

To verify that the Performance Schema monitoring tables are available, examine the [**INFORMATION\_SCHEMA.TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-tables-table) table or use the [**SHOW TABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-tables) statement. For example:

mysql> **SELECT TABLE\_NAME**

**FROM INFORMATION\_SCHEMA.TABLES**

**WHERE TABLE\_SCHEMA = 'performance\_schema'**

**AND TABLE\_NAME LIKE 'tp%';**

+-----------------------+

| TABLE\_NAME |

+-----------------------+

| tp\_thread\_group\_state |

| tp\_thread\_group\_stats |

| tp\_thread\_state |

+-----------------------+

If the server loads the thread pool plugin successfully, it sets the **thread\_handling** system variable to **loaded-dynamically**.

If the plugin fails to initialize, check the server error log for diagnostic messages.

##### Thread Pool Installation Prior to MySQL 8.0.14

Prior to MySQL 8.0.14, the thread pool monitoring tables are plugins separate from the thread pool plugin and can be installed separately.

To enable thread pool capability, load the plugins to be used by starting the server with the [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option. For example, if you name only the plugin library file, the server loads all plugins that it contains (that is, the thread pool plugin and all the **INFORMATION\_SCHEMA** tables). To do this, put these lines in the server my.cnf file, adjusting the .so suffix for your platform as necessary:

[mysqld]

plugin-load-add=thread\_pool.so

That is equivalent to loading all thread pool plugins by naming them individually:

[mysqld]

plugin-load-add=thread\_pool=thread\_pool.so

plugin-load-add=tp\_thread\_state=thread\_pool.so

plugin-load-add=tp\_thread\_group\_state=thread\_pool.so

plugin-load-add=tp\_thread\_group\_stats=thread\_pool.so

If desired, you can load individual plugins from the library file. To load the thread pool plugin but not the **INFORMATION\_SCHEMA** tables, use an option like this:

[mysqld]

plugin-load-add=thread\_pool=thread\_pool.so

To load the thread pool plugin and only the [**TP\_THREAD\_STATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-tp-thread-state-table) **INFORMATION\_SCHEMA** table, use options like this:

[mysqld]

plugin-load-add=thread\_pool=thread\_pool.so

plugin-load-add=tp\_thread\_state=thread\_pool.so

To verify plugin installation, examine the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table or use the [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement (see [Section 5.6.2, “Obtaining Server Plugin Information”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-plugin-information)). For example:

mysql> **SELECT PLUGIN\_NAME, PLUGIN\_STATUS**

**FROM INFORMATION\_SCHEMA.PLUGINS**

**WHERE PLUGIN\_NAME LIKE 'thread%' OR PLUGIN\_NAME LIKE 'tp%';**

+-----------------------+---------------+

| PLUGIN\_NAME | PLUGIN\_STATUS |

+-----------------------+---------------+

| thread\_pool | ACTIVE |

| TP\_THREAD\_STATE | ACTIVE |

| TP\_THREAD\_GROUP\_STATE | ACTIVE |

| TP\_THREAD\_GROUP\_STATS | ACTIVE |

+-----------------------+---------------+

If the server loads the thread pool plugin successfully, it sets the **thread\_handling** system variable to **loaded-dynamically**.

If a plugin fails to initialize, check the server error log for diagnostic messages.

#### 5.6.3.3 Thread Pool Operation

The thread pool consists of a number of thread groups, each of which manages a set of client connections. As connections are established, the thread pool assigns them to thread groups in round-robin fashion.

The thread pool exposes system variables that may be used to configure its operation:

* [**thread\_pool\_algorithm**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_algorithm): The concurrency algorithm to use for scheduling.
* [**thread\_pool\_high\_priority\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_high_priority_connection): How to schedule statement execution for a session.
* [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads): How many active threads per group to permit.
* [**thread\_pool\_max\_unused\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_unused_threads): How many sleeping threads to permit.
* [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer): How long before the thread pool moves a statement awaiting execution from the low-priority queue to the high-priority queue.
* [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size): The number of thread groups in the thread pool. This is the most important parameter controlling thread pool performance.
* [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit): The time before an executing statement is considered to be stalled.

To configure the number of thread groups, use the [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) system variable. The default number of groups is 16. For guidelines on setting this variable, see [Section 5.6.3.4, “Thread Pool Tuning”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#thread-pool-tuning).

The maximum number of threads per group is 4096 (or 4095 on some systems where one thread is used internally).

The thread pool separates connections and threads, so there is no fixed relationship between connections and the threads that execute statements received from those connections. This differs from the default thread-handling model that associates one thread with one connection such that a given thread executes all statements from its connection.

By default, the thread pool tries to ensure a maximum of one thread executing in each group at any time, but sometimes permits more threads to execute temporarily for best performance:

* Each thread group has a listener thread that listens for incoming statements from the connections assigned to the group. When a statement arrives, the thread group either begins executing it immediately or queues it for later execution:
  + Immediate execution occurs if the statement is the only one received and no statements are queued or currently executing.
  + Queuing occurs if the statement cannot begin executing immediately.
* If immediate execution occurs, the listener thread performs it. (This means that temporarily no thread in the group is listening.) If the statement finishes quickly, the executing thread returns to listening for statements. Otherwise, the thread pool considers the statement stalled and starts another thread as a listener thread (creating it if necessary). To ensure that no thread group becomes blocked by stalled statements, the thread pool has a background thread that regularly monitors thread group states.

By using the listening thread to execute a statement that can begin immediately, there is no need to create an additional thread if the statement finishes quickly. This ensures the most efficient execution possible in the case of a low number of concurrent threads.

When the thread pool plugin starts, it creates one thread per group (the listener thread), plus the background thread. Additional threads are created as necessary to execute statements.

* The value of the [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) system variable determines the meaning of “finishes quickly” in the previous item. The default time before threads are considered stalled is 60ms but can be set to a maximum of 6s. This parameter is configurable to enable you to strike a balance appropriate for the server work load. Short wait values permit threads to start more quickly. Short values are also better for avoiding deadlock situations. Long wait values are useful for workloads that include long-running statements, to avoid starting too many new statements while the current ones execute.
* If [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads) is 0, the default algorithm applies as just described for determining the maximum number of active threads per group. The default algorithm takes stalled threads into account and may temporarily permit more active threads. If [**thread\_pool\_max\_active\_query\_threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_max_active_query_threads) is greater than 0, it places a limit on the number of active threads per group.
* The thread pool focuses on limiting the number of concurrent short-running statements. Before an executing statement reaches the stall time, it prevents other statements from beginning to execute. If the statement executes past the stall time, it is permitted to continue but no longer prevents other statements from starting. In this way, the thread pool tries to ensure that in each thread group there is never more than one short-running statement, although there might be multiple long-running statements. It is undesirable to let long-running statements prevent other statements from executing because there is no limit on the amount of waiting that might be necessary. For example, on a replication source server, a thread that is sending binary log events to a replica effectively runs forever.
* A statement becomes blocked if it encounters a disk I/O operation or a user level lock (row lock or table lock). The block would cause the thread group to become unused, so there are callbacks to the thread pool to ensure that the thread pool can immediately start a new thread in this group to execute another statement. When a blocked thread returns, the thread pool permits it to restart immediately.
* There are two queues, a high-priority queue and a low-priority queue. The first statement in a transaction goes to the low-priority queue. Any following statements for the transaction go to the high-priority queue if the transaction is ongoing (statements for it have begun executing), or to the low-priority queue otherwise. Queue assignment can be affected by enabling the [**thread\_pool\_high\_priority\_connection**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_high_priority_connection) system variable, which causes all queued statements for a session to go into the high-priority queue.

Statements for a nontransactional storage engine, or a transactional engine if [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) is enabled, are treated as low-priority statements because in this case each statement is a transaction. Thus, given a mix of statements for **InnoDB** and **MyISAM** tables, the thread pool prioritizes those for **InnoDB** over those for **MyISAM** unless [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) is enabled. With [**autocommit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_autocommit) enabled, all statements have low priority.

* When the thread group selects a queued statement for execution, it first looks in the high-priority queue, then in the low-priority queue. If a statement is found, it is removed from its queue and begins to execute.
* If a statement stays in the low-priority queue too long, the thread pool moves to the high-priority queue. The value of the [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer) system variable controls the time before movement. For each thread group, a maximum of one statement per 10ms (100 per second) is moved from the low-priority queue to the high-priority queue.
* The thread pool reuses the most active threads to obtain a much better use of CPU caches. This is a small adjustment that has a great impact on performance.
* While a thread executes a statement from a user connection, Performance Schema instrumentation accounts thread activity to the user connection. Otherwise, Performance Schema accounts activity to the thread pool.

Here are examples of conditions under which a thread group might have multiple threads started to execute statements:

* One thread begins executing a statement, but runs long enough to be considered stalled. The thread group permits another thread to begin executing another statement even through the first thread is still executing.
* One thread begins executing a statement, then becomes blocked and reports this back to the thread pool. The thread group permits another thread to begin executing another statement.
* One thread begins executing a statement, becomes blocked, but does not report back that it is blocked because the block does not occur in code that has been instrumented with thread pool callbacks. In this case, the thread appears to the thread group to be still running. If the block lasts long enough for the statement to be considered stalled, the group permits another thread to begin executing another statement.

The thread pool is designed to be scalable across an increasing number of connections. It is also designed to avoid deadlocks that can arise from limiting the number of actively executing statements. It is important that threads that do not report back to the thread pool do not prevent other statements from executing and thus cause the thread pool to become deadlocked. Examples of such statements follow:

* Long-running statements. These would lead to all resources used by only a few statements and they could prevent all others from accessing the server.
* Binary log dump threads that read the binary log and send it to replicas. This is a kind of long-running “statement” that runs for a very long time, and that should not prevent other statements from executing.
* Statements blocked on a row lock, table lock, sleep, or any other blocking activity that has not been reported back to the thread pool by MySQL Server or a storage engine.

In each case, to prevent deadlock, the statement is moved to the stalled category when it does not complete quickly, so that the thread group can permit another statement to begin executing. With this design, when a thread executes or becomes blocked for an extended time, the thread pool moves the thread to the stalled category and for the rest of the statement's execution, it does not prevent other statements from executing.

The maximum number of threads that can occur is the sum of [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) and [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size). This can happen in a situation where all connections are in execution mode and an extra thread is created per group to listen for more statements. This is not necessarily a state that happens often, but it is theoretically possible.

#### 5.6.3.4 Thread Pool Tuning

This section provides guidelines on setting thread pool system variables for best performance, measured using a metric such as transactions per second.

[**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) is the most important parameter controlling thread pool performance. It can be set only at server startup. Our experience in testing the thread pool indicates the following:

* If the primary storage engine is [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html), the optimal [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) setting is likely to be between 16 and 36, with the most common optimal values tending to be from 24 to 36. We have not seen any situation where the setting has been optimal beyond 36. There may be special cases where a value smaller than 16 is optimal.

For workloads such as DBT2 and Sysbench, the optimum for [**InnoDB**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html) seems to be usually around 36. For very write-intensive workloads, the optimal setting can sometimes be lower.

* If the primary storage engine is [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine), the [**thread\_pool\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_size) setting should be fairly low. Optimal performance is often seen with values from 4 to 8. Higher values tend to have a slightly negative but not dramatic impact on performance.

Another system variable, [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit), is important for handling of blocked and long-running statements. If all calls that block the MySQL Server are reported to the thread pool, it would always know when execution threads are blocked. However, this may not always be true. For example, blocks could occur in code that has not been instrumented with thread pool callbacks. For such cases, the thread pool must be able to identify threads that appear to be blocked. This is done by means of a timeout that can be tuned using the [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) system variable, the value of which is measured in 10ms units. This parameter ensures that the server does not become completely blocked. The value of [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) has an upper limit of 6 seconds to prevent the risk of a deadlocked server.

[**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) also enables the thread pool to handle long-running statements. If a long-running statement was permitted to block a thread group, all other connections assigned to the group would be blocked and unable to start execution until the long-running statement completed. In the worst case, this could take hours or even days.

The value of [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) should be chosen such that statements that execute longer than its value are considered stalled. Stalled statements generate a lot of extra overhead since they involve extra context switches and in some cases even extra thread creations. On the other hand, setting the [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) parameter too high means that long-running statements block a number of short-running statements for longer than necessary. Short wait values permit threads to start more quickly. Short values are also better for avoiding deadlock situations. Long wait values are useful for workloads that include long-running statements, to avoid starting too many new statements while the current ones execute.

Suppose a server executes a workload where 99.9% of the statements complete within 100ms even when the server is loaded, and the remaining statements take between 100ms and 2 hours fairly evenly spread. In this case, it would make sense to set [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) to 10 (10 × 10ms = 100ms). The default value of 6 (60ms) is suitable for servers that primarily execute very simple statements.

The [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) parameter can be changed at runtime to enable you to strike a balance appropriate for the server work load. Assuming that the [**tp\_thread\_group\_stats**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-tp-thread-group-stats-table) table is enabled, you can use the following query to determine the fraction of executed statements that stalled:

SELECT SUM(STALLED\_QUERIES\_EXECUTED) / SUM(QUERIES\_EXECUTED)

FROM performance\_schema.tp\_thread\_group\_stats;

This number should be as low as possible. To decrease the likelihood of statements stalling, increase the value of [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit).

When a statement arrives, what is the maximum time it can be delayed before it actually starts executing? Suppose that the following conditions apply:

* There are 200 statements queued in the low-priority queue.
* There are 10 statements queued in the high-priority queue.
* [**thread\_pool\_prio\_kickup\_timer**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_prio_kickup_timer) is set to 10000 (10 seconds).
* [**thread\_pool\_stall\_limit**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_pool_stall_limit) is set to 100 (1 second).

In the worst case, the 10 high-priority statements represent 10 transactions that continue executing for a long time. Thus, in the worst case, no statements can be moved to the high-priority queue because it always already contains statements awaiting execution. After 10 seconds, the new statement is eligible to be moved to the high-priority queue. However, before it can be moved, all the statements before it must be moved as well. This could take another 2 seconds because a maximum of 100 statements per second are moved to the high-priority queue. Now when the statement reaches the high-priority queue, there could potentially be many long-running statements ahead of it. In the worst case, every one of those becomes stalled and 1 second is required for each statement before the next statement is retrieved from the high-priority queue. Thus, in this scenario, it takes 222 seconds before the new statement starts executing.

This example shows a worst case for an application. How to handle it depends on the application. If the application has high requirements for the response time, it should most likely throttle users at a higher level itself. Otherwise, it can use the thread pool configuration parameters to set some kind of a maximum waiting time.

### 5.6.4 The Rewriter Query Rewrite Plugin

[5.6.4.1 Installing or Uninstalling the Rewriter Query Rewrite Plugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-installation)

[5.6.4.2 Using the Rewriter Query Rewrite Plugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-usage)

[5.6.4.3 Rewriter Query Rewrite Plugin Reference](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-reference)

MySQL supports query rewrite plugins that can examine and possibly modify SQL statements received by the server before the server executes them. See [Query Rewrite Plugins](https://dev.mysql.com/doc/extending-mysql/8.0/en/plugin-types.html#query-rewrite-plugin-type).

MySQL distributions include a postparse query rewrite plugin named **Rewriter** and scripts for installing the plugin and its associated elements. These elements work together to provide statement-rewriting capability:

* A server-side plugin named **Rewriter** examines statements and may rewrite them, based on its in-memory cache of rewrite rules.
* These statements are subject to rewriting:
  + As of MySQL 8.0.12: [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select), [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**REPLACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#replace), [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update), and [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete).
  + Prior to MySQL 8.0.12: [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) only.

Standalone statements and prepared statements are subject to rewriting. Statements occurring within view definitions or stored programs are not subject to rewriting.

* The **Rewriter** plugin uses a database named **query\_rewrite** containing a table named **rewrite\_rules**. The table provides persistent storage for the rules that the plugin uses to decide whether to rewrite statements. Users communicate with the plugin by modifying the set of rules stored in this table. The plugin communicates with users by setting the **message** column of table rows.
* The **query\_rewrite** database contains a stored procedure named **flush\_rewrite\_rules()** that loads the contents of the rules table into the plugin.
* A loadable function named [**load\_rewrite\_rules()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_load-rewrite-rules) is used by the **flush\_rewrite\_rules()** stored procedure.
* The **Rewriter** plugin exposes system variables that enable plugin configuration and status variables that provide runtime operational information.

The following sections describe how to install and use the **Rewriter** plugin, and provide reference information for its associated elements.

#### 5.6.4.1 Installing or Uninstalling the Rewriter Query Rewrite Plugin

**Note**

If installed, the **Rewriter** plugin involves some overhead even when disabled. To avoid this overhead, do not install the plugin unless you plan to use it.

To install or uninstall the **Rewriter** query rewrite plugin, choose the appropriate script located in the share directory of your MySQL installation:

* install\_rewriter.sql: Choose this script to install the **Rewriter** plugin and its associated elements.
* uninstall\_rewriter.sql: Choose this script to uninstall the **Rewriter** plugin and its associated elements.

Run the chosen script as follows:

shell> **mysql -u root -p < install\_rewriter.sql**

Enter password: ***(enter root password here)***

The example here uses the install\_rewriter.sql installation script. Substitute uninstall\_rewriter.sql if you are uninstalling the plugin.

Running an installation script should install and enable the plugin. To verify that, connect to the server and execute this statement:

mysql> **SHOW GLOBAL VARIABLES LIKE 'rewriter\_enabled';**

+------------------+-------+

| Variable\_name | Value |

+------------------+-------+

| rewriter\_enabled | ON |

+------------------+-------+

For usage instructions, see [Section 5.6.4.2, “Using the Rewriter Query Rewrite Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-usage). For reference information, see [Section 5.6.4.3, “Rewriter Query Rewrite Plugin Reference”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-reference).

#### 5.6.4.2 Using the Rewriter Query Rewrite Plugin

To enable or disable the plugin, enable or disable the [**rewriter\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_enabled) system variable. By default, the **Rewriter** plugin is enabled when you install it (see [Section 5.6.4.1, “Installing or Uninstalling the Rewriter Query Rewrite Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-installation)). To set the initial plugin state explicitly, you can set the variable at server startup. For example, to enable the plugin in an option file, use these lines:

[mysqld]

rewriter\_enabled=ON

It is also possible to enable or disable the plugin at runtime:

SET GLOBAL rewriter\_enabled = ON;

SET GLOBAL rewriter\_enabled = OFF;

Assuming that the **Rewriter** plugin is enabled, it examines and possibly modifies each rewritable statement received by the server. The plugin determines whether to rewrite statements based on its in-memory cache of rewriting rules, which are loaded from the **rewrite\_rules** table in the **query\_rewrite** database.

These statements are subject to rewriting:

* As of MySQL 8.0.12: [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select), [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#insert), [**REPLACE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#replace), [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update), and [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete).
* Prior to MySQL 8.0.12: [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) only.

Standalone statements and prepared statements are subject to rewriting. Statements occurring within view definitions or stored programs are not subject to rewriting.

* [Adding Rewrite Rules](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-adding-rewrite-rules)
* [How Statement Matching Works](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-how-statement-matching-works)
* [Rewriting Prepared Statements](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-rewriting-prepared-statements)
* [Rewriter Plugin Operational Information](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-operational-information)
* [Rewriter Plugin Use of Character Sets](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-use-of-character-sets)

##### Adding Rewrite Rules

To add rules for the **Rewriter** plugin, add rows to the **rewrite\_rules** table, then invoke the **flush\_rewrite\_rules()** stored procedure to load the rules from the table into the plugin. The following example creates a simple rule to match statements that select a single literal value:

INSERT INTO query\_rewrite.rewrite\_rules (pattern, replacement)

VALUES('SELECT ?', 'SELECT ? + 1');

The resulting table contents look like this:

mysql> **SELECT \* FROM query\_rewrite.rewrite\_rules\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id: 1

pattern: SELECT ?

pattern\_database: NULL

replacement: SELECT ? + 1

enabled: YES

message: NULL

pattern\_digest: NULL

normalized\_pattern: NULL

The rule specifies a pattern template indicating which [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements to match, and a replacement template indicating how to rewrite matching statements. However, adding the rule to the **rewrite\_rules** table is not sufficient to cause the **Rewriter** plugin to use the rule. You must invoke **flush\_rewrite\_rules()** to load the table contents into the plugin in-memory cache:

mysql> **CALL query\_rewrite.flush\_rewrite\_rules();**

Tip

If your rewrite rules seem not to be working properly, make sure that you have reloaded the rules table by calling **flush\_rewrite\_rules()**.

When the plugin reads each rule from the rules table, it computes a normalized (statement digest) form from the pattern and a digest hash value, and uses them to update the **normalized\_pattern** and **pattern\_digest** columns:

mysql> **SELECT \* FROM query\_rewrite.rewrite\_rules\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id: 1

pattern: SELECT ?

pattern\_database: NULL

replacement: SELECT ? + 1

enabled: YES

message: NULL

pattern\_digest: d1b44b0c19af710b5a679907e284acd2ddc285201794bc69a2389d77baedddae

normalized\_pattern: select ?

For information about statement digesting, normalized statements, and digest hash values, see [Section 27.10, “Performance Schema Statement Digests and Sampling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-statement-digests).

If a rule cannot be loaded due to some error, calling **flush\_rewrite\_rules()** produces an error:

mysql> **CALL query\_rewrite.flush\_rewrite\_rules();**

ERROR 1644 (45000): Loading of some rule(s) failed.

When this occurs, the plugin writes an error message to the **message** column of the rule row to communicate the problem. Check the **rewrite\_rules** table for rows with non-**NULL** **message** column values to see what problems exist.

Patterns use the same syntax as prepared statements (see [Section 13.5.1, “PREPARE Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#prepare)). Within a pattern template, **?** characters act as parameter markers that match data values. Parameter markers can be used only where data values should appear, not for SQL keywords, identifiers, and so forth. The **?** characters should not be enclosed within quotation marks.

Like the pattern, the replacement can contain **?** characters. For a statement that matches a pattern template, the plugin rewrites it, replacing **?** parameter markers in the replacement using data values matched by the corresponding markers in the pattern. The result is a complete statement string. The plugin asks the server to parse it, and returns the result to the server as the representation of the rewritten statement.

After adding and loading the rule, check whether rewriting occurs according to whether statements match the rule pattern:

mysql> **SELECT PI();**

+----------+

| PI() |

+----------+

| 3.141593 |

+----------+

1 row in set (0.01 sec)

mysql> **SELECT 10;**

+--------+

| 10 + 1 |

+--------+

| 11 |

+--------+

1 row in set, 1 warning (0.00 sec)

No rewriting occurs for the first [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statement, but does for the second. The second statement illustrates that when the **Rewriter** plugin rewrites a statement, it produces a warning message. To view the message, use [**SHOW WARNINGS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-warnings):

mysql> **SHOW WARNINGS\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Level: Note

Code: 1105

Message: Query 'SELECT 10' rewritten to 'SELECT 10 + 1' by a query rewrite plugin

A statement need not be rewritten to a statement of the same type. The following example loads a rule that rewrites [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#delete) statements to [**UPDATE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#update) statements:

INSERT INTO query\_rewrite.rewrite\_rules (pattern, replacement)

VALUES('DELETE FROM db1.t1 WHERE col = ?',

'UPDATE db1.t1 SET col = NULL WHERE col = ?');

CALL query\_rewrite.flush\_rewrite\_rules();

To enable or disable an existing rule, modify its **enabled** column and reload the table into the plugin. To disable rule 1:

UPDATE query\_rewrite.rewrite\_rules SET enabled = 'NO' WHERE id = 1;

CALL query\_rewrite.flush\_rewrite\_rules();

This enables you to deactivate a rule without removing it from the table.

To re-enable rule 1:

UPDATE query\_rewrite.rewrite\_rules SET enabled = 'YES' WHERE id = 1;

CALL query\_rewrite.flush\_rewrite\_rules();

The **rewrite\_rules** table contains a **pattern\_database** column that **Rewriter** uses for matching table names that are not qualified with a database name:

* Qualified table names in statements match qualified names in the pattern if corresponding database and table names are identical.
* Unqualified table names in statements match unqualified names in the pattern only if the default database is the same as **pattern\_database** and the table names are identical.

Suppose that a table named **appdb.users** has a column named **id** and that applications are expected to select rows from the table using a query of one of these forms, where the second can be used only if **appdb** is the default database:

SELECT \* FROM users WHERE appdb.id = ***id\_value***;

SELECT \* FROM users WHERE id = ***id\_value***;

Suppose also that the **id** column is renamed to **user\_id** (perhaps the table must be modified to add another type of ID and it is necessary to indicate more specifically what type of ID the **id** column represents).

The change means that applications must refer to **user\_id** rather than **id** in the **WHERE** clause. But if there are old applications that cannot be written to change the **SELECT** queries they generate, they no longer work properly. The **Rewriter** plugin can solve this problem. To match and rewrite statements whether or not they qualify the table name, add the following two rules and reload the rules table:

INSERT INTO query\_rewrite.rewrite\_rules

(pattern, replacement) VALUES(

'SELECT \* FROM appdb.users WHERE id = ?',

'SELECT \* FROM appdb.users WHERE user\_id = ?'

);

INSERT INTO query\_rewrite.rewrite\_rules

(pattern, replacement, pattern\_database) VALUES(

'SELECT \* FROM users WHERE id = ?',

'SELECT \* FROM users WHERE user\_id = ?',

'appdb'

);

CALL query\_rewrite.flush\_rewrite\_rules();

**Rewriter** uses the first rule to match statements that use the qualified table name. It uses the second to match statements that used the unqualified name, but only if the default database is **appdb** (the value in **pattern\_database**).

##### How Statement Matching Works

The **Rewriter** plugin uses statement digests and digest hash values to match incoming statements against rewrite rules in stages. The **max\_digest\_length** system variable determines the size of the buffer used for computing statement digests. Larger values enable computation of digests that distinguish longer statements. Smaller values use less memory but increase the likelihood of longer statements colliding with the same digest value.

The plugin matches each statement to the rewrite rules as follows:

1. Compute the statement digest hash value and compare it to the rule digest hash values. This is subject to false positives, but serves as a quick rejection test.
2. If the statement digest hash value matches any pattern digest hash values, match the normalized (statement digest) form of the statement to the normalized form of the matching rule patterns.
3. If the normalized statement matches a rule, compare the literal values in the statement and the pattern. A **?** character in the pattern matches any literal value in the statement. If the statement prepares a statement, **?** in the pattern also matches **?** in the statement. Otherwise, corresponding literals must be the same.

If multiple rules match a statement, it is nondeterministic which one the plugin uses to rewrite the statement.

If a pattern contains more markers than the replacement, the plugin discards excess data values. If a pattern contains fewer markers than the replacement, it is an error. The plugin notices this when the rules table is loaded, writes an error message to the **message** column of the rule row to communicate the problem, and sets the [**Rewriter\_reload\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_reload_error) status variable to **ON**.

##### Rewriting Prepared Statements

Prepared statements are rewritten at parse time (that is, when they are prepared), not when they are executed later.

Prepared statements differ from nonprepared statements in that they may contain **?** characters as parameter markers. To match a **?** in a prepared statement, a **Rewriter** pattern must contain **?** in the same location. Suppose that a rewrite rule has this pattern:

SELECT ?, 3

The following table shows several prepared [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements and whether the rule pattern matches them.

| **Prepared Statement** | **Whether Pattern Matches Statement** |
| --- | --- |
| **PREPARE s AS 'SELECT 3, 3'** | Yes |
| **PREPARE s AS 'SELECT ?, 3'** | Yes |
| **PREPARE s AS 'SELECT 3, ?'** | No |
| **PREPARE s AS 'SELECT ?, ?'** | No |

##### Rewriter Plugin Operational Information

The **Rewriter** plugin makes information available about its operation by means of several status variables:

mysql> **SHOW GLOBAL STATUS LIKE 'Rewriter%';**

+-----------------------------------+-------+

| Variable\_name | Value |

+-----------------------------------+-------+

| Rewriter\_number\_loaded\_rules | 1 |

| Rewriter\_number\_reloads | 5 |

| Rewriter\_number\_rewritten\_queries | 1 |

| Rewriter\_reload\_error | ON |

+-----------------------------------+-------+

For descriptions of these variables, see [Section 5.6.4.3.4, “Rewriter Query Rewrite Plugin Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-status-variables).

When you load the rules table by calling the **flush\_rewrite\_rules()** stored procedure, if an error occurs for some rule, the **CALL** statement produces an error, and the plugin sets the **Rewriter\_reload\_error** status variable to **ON**:

mysql> **CALL query\_rewrite.flush\_rewrite\_rules();**

ERROR 1644 (45000): Loading of some rule(s) failed.

mysql> **SHOW GLOBAL STATUS LIKE 'Rewriter\_reload\_error';**

+-----------------------+-------+

| Variable\_name | Value |

+-----------------------+-------+

| Rewriter\_reload\_error | ON |

+-----------------------+-------+

In this case, check the **rewrite\_rules** table for rows with non-**NULL** **message** column values to see what problems exist.

##### Rewriter Plugin Use of Character Sets

When the **rewrite\_rules** table is loaded into the **Rewriter** plugin, the plugin interprets statements using the current global value of the [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) system variable. If the global [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) value is changed subsequently, the rules table must be reloaded.

A client must have a session [**character\_set\_client**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_character_set_client) value identical to what the global value was when the rules table was loaded or rule matching does not work for that client.

#### 5.6.4.3 Rewriter Query Rewrite Plugin Reference

The following discussion serves as a reference to these elements associated with the **Rewriter** query rewrite plugin:

* The **Rewriter** rules table in the **query\_rewrite** database
* **Rewriter** procedures and functions
* **Rewriter** system and status variables

##### 5.6.4.3.1 Rewriter Query Rewrite Plugin Rules Table

The **rewrite\_rules** table in the **query\_rewrite** database provides persistent storage for the rules that the **Rewriter** plugin uses to decide whether to rewrite statements.

Users communicate with the plugin by modifying the set of rules stored in this table. The plugin communicates information to users by setting the table's **message** column.

**Note**

The rules table is loaded into the plugin by the **flush\_rewrite\_rules** stored procedure. Unless that procedure has been called following the most recent table modification, the table contents do not necessarily correspond to the set of rules the plugin is using.

The **rewrite\_rules** table has these columns:

* **id**

The rule ID. This column is the table primary key. You can use the ID to uniquely identify any rule.

* **pattern**

The template that indicates the pattern for statements that the rule matches. Use **?** to represent parameter markers that match data values.

* **pattern\_database**

The database used to match unqualified table names in statements. Qualified table names in statements match qualified names in the pattern if corresponding database and table names are identical. Unqualified table names in statements match unqualified names in the pattern only if the default database is the same as **pattern\_database** and the table names are identical.

* **replacement**

The template that indicates how to rewrite statements matching the **pattern** column value. Use **?** to represent parameter markers that match data values. In rewritten statements, the plugin replaces **?** parameter markers in **replacement** using data values matched by the corresponding markers in **pattern**.

* **enabled**

Whether the rule is enabled. Load operations (performed by invoking the **flush\_rewrite\_rules()** stored procedure) load the rule from the table into the **Rewriter** in-memory cache only if this column is **YES**.

This column makes it possible to deactivate a rule without removing it: Set the column to a value other than **YES** and reload the table into the plugin.

* **message**

The plugin uses this column for communicating with users. If no error occurs when the rules table is loaded into memory, the plugin sets the **message** column to **NULL**. A non-**NULL** value indicates an error and the column contents are the error message. Errors can occur under these circumstances:

* + Either the pattern or the replacement is an incorrect SQL statement that produces syntax errors.
  + The replacement contains more **?** parameter markers than the pattern.

If a load error occurs, the plugin also sets the [**Rewriter\_reload\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_reload_error) status variable to **ON**.

* **pattern\_digest**

This column is used for debugging and diagnostics. If the column exists when the rules table is loaded into memory, the plugin updates it with the pattern digest. This column may be useful if you are trying to determine why some statement fails to be rewritten.

* **normalized\_pattern**

This column is used for debugging and diagnostics. If the column exists when the rules table is loaded into memory, the plugin updates it with the normalized form of the pattern. This column may be useful if you are trying to determine why some statement fails to be rewritten.

##### 5.6.4.3.2 Rewriter Query Rewrite Plugin Procedures and Functions

**Rewriter** plugin operation uses a stored procedure that loads the rules table into its in-memory cache, and a helper loadable function. Under normal operation, users invoke only the stored procedure. The function is intended to be invoked by the stored procedure, not directly by users.

* **flush\_rewrite\_rules()**

This stored procedure uses the [**load\_rewrite\_rules()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_load-rewrite-rules) function to load the contents of the **rewrite\_rules** table into the **Rewriter** in-memory cache.

Calling **flush\_rewrite\_rules()** implies [**COMMIT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#commit).

Invoke this procedure after you modify the rules table to cause the plugin to update its cache from the new table contents. If any errors occur, the plugin sets the **message** column for the appropriate rule rows in the table and sets the [**Rewriter\_reload\_error**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Rewriter_reload_error) status variable to **ON**.

* **[load\_rewrite\_rules()](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_load-rewrite-rules)**

This function is a helper routine used by the **flush\_rewrite\_rules()** stored procedure.

##### 5.6.4.3.3 Rewriter Query Rewrite Plugin System Variables

The **Rewriter** query rewrite plugin supports the following system variables. These variables are available only if the plugin is installed (see [Section 5.6.4.1, “Installing or Uninstalling the Rewriter Query Rewrite Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-installation)).

* **[rewriter\_enabled](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_rewriter_enabled)**

|  |  |
| --- | --- |
| **System Variable** | [**rewriter\_enabled**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_enabled) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Whether the **Rewriter** query rewrite plugin is enabled.

* **[rewriter\_verbose](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_rewriter_verbose)**

|  |  |
| --- | --- |
| **System Variable** | [**rewriter\_verbose**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_rewriter_verbose) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |

* For internal use.

##### 5.6.4.3.4 Rewriter Query Rewrite Plugin Status Variables

The **Rewriter** query rewrite plugin supports the following status variables. These variables are available only if the plugin is installed (see [Section 5.6.4.1, “Installing or Uninstalling the Rewriter Query Rewrite Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#rewriter-query-rewrite-plugin-installation)).

* **[Rewriter\_number\_loaded\_rules](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rewriter_number_loaded_rules)**

The number of rewrite plugin rewrite rules successfully loaded from the **rewrite\_rules** table into memory for use by the **Rewriter** plugin.

* **[Rewriter\_number\_reloads](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rewriter_number_reloads)**

The number of times the **rewrite\_rules** table has been loaded into the in-memory cache used by the **Rewriter** plugin.

* **[Rewriter\_number\_rewritten\_queries](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rewriter_number_rewritten_queries)**

The number of queries rewritten by the **Rewriter** query rewrite plugin since it was loaded.

* **[Rewriter\_reload\_error](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "statvar_Rewriter_reload_error)**

Whether an error occurred the most recent time that the **rewrite\_rules** table was loaded into the in-memory cache used by the **Rewriter** plugin. If the value is **OFF**, no error occurred. If the value is **ON**, an error occurred; check the **message** column of the **rewriter\_rules** table for error messages.

### 5.6.5 The ddl\_rewriter Plugin

[5.6.5.1 Installing or Uninstalling ddl\_rewriter](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ddl-rewriter-installation)

[5.6.5.2 ddl\_rewriter Plugin Options](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ddl-rewriter-options)

MySQL 8.0.16 and higher includes a **ddl\_rewriter** plugin that modifies [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statements received by the server before it parses and executes them. The plugin removes **ENCRYPTION**, **DATA DIRECTORY**, and **INDEX DIRECTORY** clauses, which may be helpful when restoring tables from SQL dump files created from databases that are encrypted or that have their tables stored outside the data directory. For example, the plugin may enable restoring such dump files into an unencrypted instance or in an environment where the paths outside the data directory are not accessible.

Before using the **ddl\_rewriter** plugin, install it according to the instructions provided in [Section 5.6.5.1, “Installing or Uninstalling ddl\_rewriter”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ddl-rewriter-installation).

**ddl\_rewriter** examines SQL statements received by the server prior to parsing, rewriting them according to these conditions:

* **ddl\_rewriter** considers only [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statements, and only if they are standalone statements that occur at the beginning of an input line or at the beginning of prepared statement text. **ddl\_rewriter** does not consider [**CREATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-table) statements within stored program definitions. Statements can extend over multiple lines.
* Within statements considered for rewrite, instances of the following clauses are rewritten and each instance replaced by a single space:
  + **ENCRYPTION**
  + **DATA DIRECTORY** (at the table and partition levels)
  + **INDEX DIRECTORY** (at the table and partition levels)
* Rewriting does not depend on lettercase.

If **ddl\_rewriter** rewrites a statement, it generates a warning:

mysql> **CREATE TABLE t (i INT) DATA DIRECTORY '/var/mysql/data';**

Query OK, 0 rows affected, 1 warning (0.03 sec)

mysql> **SHOW WARNINGS\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Level: Note

Code: 1105

Message: Query 'CREATE TABLE t (i INT) DATA DIRECTORY '/var/mysql/data''

rewritten to 'CREATE TABLE t (i INT) ' by a query rewrite plugin

1 row in set (0.00 sec)

If the general query log or binary log is enabled, the server writes to it statements as they appear after any rewriting by **ddl\_rewriter**.

When installed, **ddl\_rewriter** exposes the Performance Schema **memory/rewriter/ddl\_rewriter** instrument for tracking plugin memory use. See [Section 27.12.20.10, “Memory Summary Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-memory-summary-tables)

#### 5.6.5.1 Installing or Uninstalling ddl\_rewriter

This section describes how to install or uninstall the **ddl\_rewriter** plugin. For general information about installing plugins, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).

**Note**

If installed, the **ddl\_rewriter** plugin involves some minimal overhead even when disabled. To avoid this overhead, install **ddl\_rewriter** only for the period during which you intend to use it.

The primary use case is modification of statements restored from dump files, so the typical usage pattern is: 1) Install the plugin; 2) restore the dump file or files; 3) uninstall the plugin.

To be usable by the server, the plugin library file must be located in the MySQL plugin directory (the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable). If necessary, configure the plugin directory location by setting the value of [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) at server startup.

The plugin library file base name is **ddl\_rewriter**. The file name suffix differs per platform (for example, .so for Unix and Unix-like systems, .dll for Windows).

To install the **ddl\_rewriter** plugin, use the [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) statement, adjusting the .so suffix for your platform as necessary:

INSTALL PLUGIN ddl\_rewriter SONAME 'ddl\_rewriter.so';

To verify plugin installation, examine the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table or use the [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement (see [Section 5.6.2, “Obtaining Server Plugin Information”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-plugin-information)). For example:

mysql> **SELECT PLUGIN\_NAME, PLUGIN\_STATUS, PLUGIN\_TYPE**

**FROM INFORMATION\_SCHEMA.PLUGINS**

**WHERE PLUGIN\_NAME LIKE 'ddl%';**

+--------------+---------------+-------------+

| PLUGIN\_NAME | PLUGIN\_STATUS | PLUGIN\_TYPE |

+--------------+---------------+-------------+

| ddl\_rewriter | ACTIVE | AUDIT |

+--------------+---------------+-------------+

As the preceding result shows, **ddl\_rewriter** is implemented as an audit plugin.

If the plugin fails to initialize, check the server error log for diagnostic messages.

Once installed as just described, **ddl\_rewriter** remains installed until uninstalled. To remove it, use [**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin):

UNINSTALL PLUGIN ddl\_rewriter;

If **ddl\_rewriter** is installed, you can use the [--ddl-rewriter](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ddl-rewriter) option for subsequent server startups to control **ddl\_rewriter** plugin activation. For example, to prevent the plugin from being enabled at runtime, use this option:

[mysqld]

ddl-rewriter=OFF

#### 5.6.5.2 ddl\_rewriter Plugin Options

This section describes the command options that control operation of the **ddl\_rewriter** plugin. If values specified at startup time are incorrect, the **ddl\_rewriter** plugin may fail to initialize properly and the server does not load it.

To control activation of the **ddl\_rewriter** plugin, use this option:

* [--ddl-rewriter[=](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_ddl-rewriter)***[value](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_ddl-rewriter)***[]](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "option_mysqld_ddl-rewriter)

|  |  |
| --- | --- |
| **Command-Line Format** | **--ddl-rewriter[=value]** |
| **Introduced** | 8.0.16 |
| **Type** | Enumeration |
| **Default Value** | **ON** |
| **Valid Values** | **ON**  **OFF**  **FORCE**  **FORCE\_PLUS\_PERMANENT** |

* This option controls how the server loads the **ddl\_rewriter** plugin at startup. It is available only if the plugin has been previously registered with [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) or is loaded with [--plugin-load](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load) or [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add). See [Section 5.6.5.1, “Installing or Uninstalling ddl\_rewriter”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#ddl-rewriter-installation).
* The option value should be one of those available for plugin-loading options, as described in [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading). For example, [--ddl-rewriter=OFF](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_ddl-rewriter) disables the plugin at server startup.

### 5.6.6 Version Tokens

[5.6.6.1 Version Tokens Elements](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-elements)

[5.6.6.2 Installing or Uninstalling Version Tokens](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-installation)

[5.6.6.3 Using Version Tokens](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-usage)

[5.6.6.4 Version Tokens Reference](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-reference)

MySQL includes Version Tokens, a feature that enables creation of and synchronization around server tokens that applications can use to prevent accessing incorrect or out-of-date data.

The Version Tokens interface has these characteristics:

* Version tokens are pairs consisting of a name that serves as a key or identifier, plus a value.
* Version tokens can be locked. An application can use token locks to indicate to other cooperating applications that tokens are in use and should not be modified.
* Version token lists are established per server (for example, to specify the server assignment or operational state). In addition, an application that communicates with a server can register its own list of tokens that indicate the state it requires the server to be in. An SQL statement sent by the application to a server not in the required state produces an error. This is a signal to the application that it should seek a different server in the required state to receive the SQL statement.

The following sections describe the elements of Version Tokens, discuss how to install and use it, and provide reference information for its elements.

#### 5.6.6.1 Version Tokens Elements

Version Tokens is based on a plugin library that implements these elements:

* A server-side plugin named **version\_tokens** holds the list of version tokens associated with the server and subscribes to notifications for statement execution events. The **version\_tokens** plugin uses the [audit plugin API](https://dev.mysql.com/doc/extending-mysql/8.0/en/plugin-types.html#audit-plugin-type) to monitor incoming statements from clients and matches each client's session-specific version token list against the server version token list. If there is a match, the plugin lets the statement through and the server continues to process it. Otherwise, the plugin returns an error to the client and the statement fails.
* A set of loadable functions provides an SQL-level API for manipulating and inspecting the list of server version tokens maintained by the plugin. The [**VERSION\_TOKEN\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_version-token-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege) is required to call any of the Version Token functions.
* When the **version\_tokens** plugin loads, it defines the [**VERSION\_TOKEN\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_version-token-admin) dynamic privilege. This privilege can be granted to users of the functions.
* A system variable enables clients to specify the list of version tokens that register the required server state. If the server has a different state when a client sends a statement, the client receives an error.

#### 5.6.6.2 Installing or Uninstalling Version Tokens

**Note**

If installed, Version Tokens involves some overhead. To avoid this overhead, do not install it unless you plan to use it.

This section describes how to install or uninstall Version Tokens, which is implemented in a plugin library file containing a plugin and loadable functions. For general information about installing or uninstalling plugins and loadable functions, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading), and [Section 5.7.1, “Installing and Uninstalling Loadable Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function-loading).

To be usable by the server, the plugin library file must be located in the MySQL plugin directory (the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable). If necessary, configure the plugin directory location by setting the value of [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) at server startup.

The plugin library file base name is **version\_tokens**. The file name suffix differs per platform (for example, .so for Unix and Unix-like systems, .dll for Windows).

To install the Version Tokens plugin and functions, use the [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) and [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function) statements, adjusting the .so suffix for your platform as necessary:

INSTALL PLUGIN version\_tokens SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_set RETURNS STRING

SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_show RETURNS STRING

SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_edit RETURNS STRING

SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_delete RETURNS STRING

SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_lock\_shared RETURNS INT

SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_lock\_exclusive RETURNS INT

SONAME 'version\_token.so';

CREATE FUNCTION version\_tokens\_unlock RETURNS INT

SONAME 'version\_token.so';

You must install the functions to manage the server's version token list, but you must also install the plugin because the functions do not work correctly without it.

If the plugin and functions are used on a replication source server, install them on all replica servers as well to avoid replication problems.

Once installed as just described, the plugin and functions remain installed until uninstalled. To remove them, use the [**UNINSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#uninstall-plugin) and [**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function) statements:

UNINSTALL PLUGIN version\_tokens;

DROP FUNCTION version\_tokens\_set;

DROP FUNCTION version\_tokens\_show;

DROP FUNCTION version\_tokens\_edit;

DROP FUNCTION version\_tokens\_delete;

DROP FUNCTION version\_tokens\_lock\_shared;

DROP FUNCTION version\_tokens\_lock\_exclusive;

DROP FUNCTION version\_tokens\_unlock;

#### 5.6.6.3 Using Version Tokens

Before using Version Tokens, install it according to the instructions provided at [Section 5.6.6.2, “Installing or Uninstalling Version Tokens”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-installation).

A scenario in which Version Tokens can be useful is a system that accesses a collection of MySQL servers but needs to manage them for load balancing purposes by monitoring them and adjusting server assignments according to load changes. Such a system comprises these elements:

* The collection of MySQL servers to be managed.
* An administrative or management application that communicates with the servers and organizes them into high-availability groups. Groups serve different purposes, and servers within each group may have different assignments. Assignment of a server within a certain group can change at any time.
* Client applications that access the servers to retrieve and update data, choosing servers according to the purposes assigned them. For example, a client should not send an update to a read-only server.

Version Tokens permit server access to be managed according to assignment without requiring clients to repeatedly query the servers about their assignments:

* The management application performs server assignments and establishes version tokens on each server to reflect its assignment. The application caches this information to provide a central access point to it.

If at some point the management application needs to change a server assignment (for example, to change it from permitting writes to read only), it changes the server's version token list and updates its cache.

* To improve performance, client applications obtain cache information from the management application, enabling them to avoid having to retrieve information about server assignments for each statement. Based on the type of statements it issues (for example, reads versus writes), a client selects an appropriate server and connects to it.
* In addition, the client sends to the server its own client-specific version tokens to register the assignment it requires of the server. For each statement sent by the client to the server, the server compares its own token list with the client token list. If the server token list contains all tokens present in the client token list with the same values, there is a match and the server executes the statement.

On the other hand, perhaps the management application has changed the server assignment and its version token list. In this case, the new server assignment may now be incompatible with the client requirements. A token mismatch between the server and client token lists occurs and the server returns an error in reply to the statement. This is an indication to the client to refresh its version token information from the management application cache, and to select a new server to communicate with.

The client-side logic for detecting version token errors and selecting a new server can be implemented different ways:

* The client can handle all version token registration, mismatch detection, and connection switching itself.
* The logic for those actions can be implemented in a connector that manages connections between clients and MySQL servers. Such a connector might handle mismatch error detection and statement resending itself, or it might pass the error to the application and leave it to the application to resend the statement.

The following example illustrates the preceding discussion in more concrete form.

When Version Tokens initializes on a given server, the server's version token list is empty. Token list maintenance is performed by calling functions. The [**VERSION\_TOKEN\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_version-token-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege) is required to call any of the Version Token functions, so token list modification is expected to be done by a management or administrative application that has that privilege.

Suppose that a management application communicates with a set of servers that are queried by clients to access employee and product databases (named **emp** and **prod**, respectively). All servers are permitted to process data retrieval statements, but only some of them are permitted to make database updates. To handle this on a database-specific basis, the management application establishes a list of version tokens on each server. In the token list for a given server, token names represent database names and token values are **read** or **write** depending on whether the database must be used in read-only fashion or whether it can take reads and writes.

Client applications register a list of version tokens they require the server to match by setting a system variable. Variable setting occurs on a client-specific basis, so different clients can register different requirements. By default, the client token list is empty, which matches any server token list. When a client sets its token list to a nonempty value, matching may succeed or fail, depending on the server version token list.

To define the version token list for a server, the management application calls the [**version\_tokens\_set()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-set) function. (There are also functions for modifying and displaying the token list, described later.) For example, the application might send these statements to a group of three servers:

Server 1:

mysql> **SELECT version\_tokens\_set('emp=read;prod=read');**

+------------------------------------------+

| version\_tokens\_set('emp=read;prod=read') |

+------------------------------------------+

| 2 version tokens set. |

+------------------------------------------+

Server 2:

mysql> **SELECT version\_tokens\_set('emp=write;prod=read');**

+-------------------------------------------+

| version\_tokens\_set('emp=write;prod=read') |

+-------------------------------------------+

| 2 version tokens set. |

+-------------------------------------------+

Server 3:

mysql> **SELECT version\_tokens\_set('emp=read;prod=write');**

+-------------------------------------------+

| version\_tokens\_set('emp=read;prod=write') |

+-------------------------------------------+

| 2 version tokens set. |

+-------------------------------------------+

The token list in each case is specified as a semicolon-separated list of ***name*=*value*** pairs. The resulting token list values result in these server assingments:

* Any server accepts reads for either database.
* Only server 2 accepts updates for the **emp** database.
* Only server 3 accepts updates for the **prod** database.

In addition to assigning each server a version token list, the management application also maintains a cache that reflects the server assignments.

Before communicating with the servers, a client application contacts the management application and retrieves information about server assignments. Then the client selects a server based on those assignments. Suppose that a client wants to perform both reads and writes on the **emp** database. Based on the preceding assignments, only server 2 qualifies. The client connects to server 2 and registers its server requirements there by setting its [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) system variable:

mysql> **SET @@SESSION.version\_tokens\_session = 'emp=write';**

For subsequent statements sent by the client to server 2, the server compares its own version token list to the client list to check whether they match. If so, statements execute normally:

mysql> **UPDATE emp.employee SET salary = salary \* 1.1 WHERE id = 4981;**

Query OK, 1 row affected (0.07 sec)

Rows matched: 1 Changed: 1 Warnings: 0

mysql> **SELECT last\_name, first\_name FROM emp.employee WHERE id = 4981;**

+-----------+------------+

| last\_name | first\_name |

+-----------+------------+

| Smith | Abe |

+-----------+------------+

1 row in set (0.01 sec)

Discrepancies between the server and client version token lists can occur two ways:

* A token name in the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value is not present in the server token list. In this case, an [**ER\_VTOKEN\_PLUGIN\_TOKEN\_NOT\_FOUND**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_vtoken_plugin_token_not_found) error occurs.
* A token value in the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value differs from the value of the corresponding token in the server token list. In this case, an [**ER\_VTOKEN\_PLUGIN\_TOKEN\_MISMATCH**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_vtoken_plugin_token_mismatch) error occurs.

As long as the assignment of server 2 does not change, the client continues to use it for reads and writes. But suppose that the management application wants to change server assignments so that writes for the **emp** database must be sent to server 1 instead of server 2. To do this, it uses [**version\_tokens\_edit()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-edit) to modify the **emp** token value on the two servers (and updates its cache of server assignments):

Server 1:

mysql> **SELECT version\_tokens\_edit('emp=write');**

+----------------------------------+

| version\_tokens\_edit('emp=write') |

+----------------------------------+

| 1 version tokens updated. |

+----------------------------------+

Server 2:

mysql> **SELECT version\_tokens\_edit('emp=read');**

+---------------------------------+

| version\_tokens\_edit('emp=read') |

+---------------------------------+

| 1 version tokens updated. |

+---------------------------------+

[**version\_tokens\_edit()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-edit) modifies the named tokens in the server token list and leaves other tokens unchanged.

The next time the client sends a statement to server 2, its own token list no longer matches the server token list and an error occurs:

mysql> **UPDATE emp.employee SET salary = salary \* 1.1 WHERE id = 4982;**

ERROR 3136 (42000): Version token mismatch for emp. Correct value read

In this case, the client should contact the management application to obtain updated information about server assignments, select a new server, and send the failed statement to the new server.

**Note**

Each client must cooperate with Version Tokens by sending only statements in accordance with the token list that it registers with a given server. For example, if a client registers a token list of **'emp=read'**, there is nothing in Version Tokens to prevent the client from sending updates for the **emp** database. The client itself must refrain from doing so.

For each statement received from a client, the server implicitly uses locking, as follows:

* Take a shared lock for each token named in the client token list (that is, in the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value)
* Perform the comparison between the server and client token lists
* Execute the statement or produce an error depending on the comparison result
* Release the locks

The server uses shared locks so that comparisons for multiple sessions can occur without blocking, while preventing changes to the tokens for any session that attempts to acquire an exclusive lock before it manipulates tokens of the same names in the server token list.

The preceding example uses only a few of the functions included in the Version Tokens plugin library, but there are others. One set of functions permits the server's list of version tokens to be manipulated and inspected. Another set of functions permits version tokens to be locked and unlocked.

These functions permit the server's list of version tokens to be created, changed, removed, and inspected:

* [**version\_tokens\_set()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-set) completely replaces the current list and assigns a new list. The argument is a semicolon-separated list of ***name*=*value*** pairs.
* [**version\_tokens\_edit()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-edit) enables partial modifications to the current list. It can add new tokens or change the values of existing tokens. The argument is a semicolon-separated list of ***name*=*value*** pairs.
* [**version\_tokens\_delete()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-delete) deletes tokens from the current list. The argument is a semicolon-separated list of token names.
* [**version\_tokens\_show()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-show) displays the current token list. It takes no argument.

Each of those functions, if successful, returns a binary string indicating what action occurred. The following example establishes the server token list, modifies it by adding a new token, deletes some tokens, and displays the resulting token list:

mysql> **SELECT version\_tokens\_set('tok1=a;tok2=b');**

+-------------------------------------+

| version\_tokens\_set('tok1=a;tok2=b') |

+-------------------------------------+

| 2 version tokens set. |

+-------------------------------------+

mysql> **SELECT version\_tokens\_edit('tok3=c');**

+-------------------------------+

| version\_tokens\_edit('tok3=c') |

+-------------------------------+

| 1 version tokens updated. |

+-------------------------------+

mysql> **SELECT version\_tokens\_delete('tok2;tok1');**

+------------------------------------+

| version\_tokens\_delete('tok2;tok1') |

+------------------------------------+

| 2 version tokens deleted. |

+------------------------------------+

mysql> **SELECT version\_tokens\_show();**

+-----------------------+

| version\_tokens\_show() |

+-----------------------+

| tok3=c; |

+-----------------------+

Warnings occur if a token list is malformed:

mysql> **SELECT version\_tokens\_set('tok1=a; =c');**

+----------------------------------+

| version\_tokens\_set('tok1=a; =c') |

+----------------------------------+

| 1 version tokens set. |

+----------------------------------+

1 row in set, 1 warning (0.00 sec)

mysql> **SHOW WARNINGS\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Level: Warning

Code: 42000

Message: Invalid version token pair encountered. The list provided

is only partially updated.

1 row in set (0.00 sec)

As mentioned previously, version tokens are defined using a semicolon-separated list of ***name*=*value*** pairs. Consider this invocation of [**version\_tokens\_set()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-set):

mysql> **SELECT version\_tokens\_set('tok1=b;;; tok2= a = b ; tok1 = 1\'2 3"4')**

+---------------------------------------------------------------+

| version\_tokens\_set('tok1=b;;; tok2= a = b ; tok1 = 1\'2 3"4') |

+---------------------------------------------------------------+

| 3 version tokens set. |

+---------------------------------------------------------------+

Version Tokens interprets the argument as follows:

* Whitespace around names and values is ignored. Whitespace within names and values is permitted. (For [**version\_tokens\_delete()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-delete), which takes a list of names without values, whitespace around names is ignored.)
* There is no quoting mechanism.
* Order of tokens is not significant except that if a token list contains multiple instances of a given token name, the last value takes precedence over earlier values.

Given those rules, the preceding [**version\_tokens\_set()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-set) call results in a token list with two tokens: **tok1** has the value **1'2 3"4**, and **tok2** has the value **a = b**. To verify this, call [**version\_tokens\_show()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-show):

mysql> **SELECT version\_tokens\_show();**

+--------------------------+

| version\_tokens\_show() |

+--------------------------+

| tok2=a = b;tok1=1'2 3"4; |

+--------------------------+

If the token list contains two tokens, why did [**version\_tokens\_set()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-set) return the value **3 version tokens set**? That occurred because the original token list contained two definitions for **tok1**, and the second definition replaced the first.

The Version Tokens token-manipulation functions place these constraints on token names and values:

* Token names cannot contain **=** or **;** characters and have a maximum length of 64 characters.
* Token values cannot contain **;** characters. Length of values is constrained by the value of the [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) system variable.
* Version Tokens treats token names and values as binary strings, so comparisons are case-sensitive.

Version Tokens also includes a set of functions enabling tokens to be locked and unlocked:

* [**version\_tokens\_lock\_exclusive()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-lock-exclusive) acquires exclusive version token locks. It takes a list of one or more lock names and a timeout value.
* [**version\_tokens\_lock\_shared()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-lock-shared) acquires shared version token locks. It takes a list of one or more lock names and a timeout value.
* [**version\_tokens\_unlock()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-unlock) releases version token locks (exclusive and shared). It takes no argument.

Each locking function returns nonzero for success. Otherwise, an error occurs:

mysql> **SELECT version\_tokens\_lock\_shared('lock1', 'lock2', 0);**

+-------------------------------------------------+

| version\_tokens\_lock\_shared('lock1', 'lock2', 0) |

+-------------------------------------------------+

| 1 |

+-------------------------------------------------+

mysql> **SELECT version\_tokens\_lock\_shared(NULL, 0);**

ERROR 3131 (42000): Incorrect locking service lock name '(null)'.

Locking using Version Tokens locking functions is advisory; applications must agree to cooperate.

It is possible to lock nonexisting token names. This does not create the tokens.

**Note**

Version Tokens locking functions are based on the locking service described at [Section 5.6.9.1, “The Locking Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service), and thus have the same semantics for shared and exclusive locks. (Version Tokens uses the locking service routines built into the server, not the locking service function interface, so those functions need not be installed to use Version Tokens.) Locks acquired by Version Tokens use a locking service namespace of **version\_token\_locks**. Locking service locks can be monitored using the Performance Schema, so this is also true for Version Tokens locks. For details, see [Locking Service Monitoring](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-monitoring).

For the Version Tokens locking functions, token name arguments are used exactly as specified. Surrounding whitespace is not ignored and **=** and **;** characters are permitted. This is because Version Tokens simply passes the token names to be locked as is to the locking service.

#### 5.6.6.4 Version Tokens Reference

The following discussion serves as a reference to these Version Tokens elements:

* [Version Tokens Functions](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-routines)
* [Version Tokens System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-system-variables)

##### Version Tokens Functions

The Version Tokens plugin library includes several functions. One set of functions permits the server's list of version tokens to be manipulated and inspected. Another set of functions permits version tokens to be locked and unlocked. The [**VERSION\_TOKEN\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_version-token-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege) is required to invoke any Version Tokens function.

The following functions permit the server's list of version tokens to be created, changed, removed, and inspected. Interpretation of ***name\_list*** and ***token\_list*** arguments (including whitespace handling) occurs as described in [Section 5.6.6.3, “Using Version Tokens”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-usage), which provides details about the syntax for specifying tokens, as well as additional examples.

* **[version\_tokens\_delete(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-delete)*[name\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-delete)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-delete)**

Deletes tokens from the server's list of version tokens using the ***name\_list*** argument and returns a binary string that indicates the outcome of the operation. ***name\_list*** is a semicolon-separated list of version token names to delete.

mysql> **SELECT version\_tokens\_delete('tok1;tok3');**

+------------------------------------+

| version\_tokens\_delete('tok1;tok3') |

+------------------------------------+

| 2 version tokens deleted. |

+------------------------------------+

An argument of **NULL** is treated as an empty string, which has no effect on the token list.

[**version\_tokens\_delete()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-delete) deletes the tokens named in its argument, if they exist. (It is not an error to delete nonexisting tokens.) To clear the token list entirely without knowing which tokens are in the list, pass **NULL** or a string containing no tokens to [**version\_tokens\_set()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-set):

mysql> **SELECT version\_tokens\_set(NULL);**

+------------------------------+

| version\_tokens\_set(NULL) |

+------------------------------+

| Version tokens list cleared. |

+------------------------------+

mysql> **SELECT version\_tokens\_set('');**

+------------------------------+

| version\_tokens\_set('') |

+------------------------------+

| Version tokens list cleared. |

+------------------------------+

* **[version\_tokens\_edit(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-edit)*[token\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-edit)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-edit)**

Modifies the server's list of version tokens using the ***token\_list*** argument and returns a binary string that indicates the outcome of the operation. ***token\_list*** is a semicolon-separated list of ***name*=*value*** pairs specifying the name of each token to be defined and its value. If a token exists, its value is updated with the given value. If a token does not exist, it is created with the given value. If the argument is **NULL** or a string containing no tokens, the token list remains unchanged.

mysql> **SELECT version\_tokens\_set('tok1=value1;tok2=value2');**

+-----------------------------------------------+

| version\_tokens\_set('tok1=value1;tok2=value2') |

+-----------------------------------------------+

| 2 version tokens set. |

+-----------------------------------------------+

mysql> **SELECT version\_tokens\_edit('tok2=new\_value2;tok3=new\_value3');**

+--------------------------------------------------------+

| version\_tokens\_edit('tok2=new\_value2;tok3=new\_value3') |

+--------------------------------------------------------+

| 2 version tokens updated. |

+--------------------------------------------------------+

* **[version\_tokens\_set(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-set)*[token\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-set)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-set)**

Replaces the server's list of version tokens with the tokens defined in the ***token\_list*** argument and returns a binary string that indicates the outcome of the operation. ***token\_list*** is a semicolon-separated list of ***name*=*value*** pairs specifying the name of each token to be defined and its value. If the argument is **NULL** or a string containing no tokens, the token list is cleared.

mysql> **SELECT version\_tokens\_set('tok1=value1;tok2=value2');**

+-----------------------------------------------+

| version\_tokens\_set('tok1=value1;tok2=value2') |

+-----------------------------------------------+

| 2 version tokens set. |

+-----------------------------------------------+

* **[version\_tokens\_show()](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-show)**

Returns the server's list of version tokens as a binary string containing a semicolon-separated list of ***name*=*value*** pairs.

mysql> **SELECT version\_tokens\_show();**

+--------------------------+

| version\_tokens\_show() |

+--------------------------+

| tok2=value2;tok1=value1; |

+--------------------------+

The following functions permit version tokens to be locked and unlocked:

* **[version\_tokens\_lock\_exclusive(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)*[token\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)*[[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)*[token\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)*[] ...,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)*[timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-exclusive)**

Acquires exclusive locks on one or more version tokens, specified by name as strings, timing out with an error if the locks are not acquired within the given timeout value.

mysql> **SELECT version\_tokens\_lock\_exclusive('lock1', 'lock2', 10);**

+-----------------------------------------------------+

| version\_tokens\_lock\_exclusive('lock1', 'lock2', 10) |

+-----------------------------------------------------+

| 1 |

+-----------------------------------------------------+

* **[version\_tokens\_lock\_shared(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)*[token\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)*[[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)*[token\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)*[] ...,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)*[timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-lock-shared)**

Acquires shared locks on one or more version tokens, specified by name as strings, timing out with an error if the locks are not acquired within the given timeout value.

mysql> **SELECT version\_tokens\_lock\_shared('lock1', 'lock2', 10);**

+--------------------------------------------------+

| version\_tokens\_lock\_shared('lock1', 'lock2', 10) |

+--------------------------------------------------+

| 1 |

+--------------------------------------------------+

* **[version\_tokens\_unlock()](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_version-tokens-unlock)**

Releases all locks that were acquired within the current session using [**version\_tokens\_lock\_exclusive()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-lock-exclusive) and [**version\_tokens\_lock\_shared()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_version-tokens-lock-shared).

mysql> **SELECT version\_tokens\_unlock();**

+-------------------------+

| version\_tokens\_unlock() |

+-------------------------+

| 1 |

+-------------------------+

The locking functions share these characteristics:

* The return value is nonzero for success. Otherwise, an error occurs.
* Token names are strings.
* In contrast to argument handling for the functions that manipulate the server token list, whitespace surrounding token name arguments is not ignored and **=** and **;** characters are permitted.
* It is possible to lock nonexisting token names. This does not create the tokens.
* Timeout values are nonnegative integers representing the time in seconds to wait to acquire locks before timing out with an error. If the timeout is 0, there is no waiting and the function produces an error if locks cannot be acquired immediately.
* Version Tokens locking functions are based on the locking service described at [Section 5.6.9.1, “The Locking Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service).

##### Version Tokens System Variables

Version Tokens supports the following system variables. These variables are unavailable unless the Version Tokens plugin is installed (see [Section 5.6.6.2, “Installing or Uninstalling Version Tokens”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#version-tokens-installation)).

System variables:

* **[version\_tokens\_session](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version_tokens_session)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--version-tokens-session=value** |
| **System Variable** | [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) |
| **Scope** | Global, Session |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **NULL** |

* The session value of this variable specifies the client version token list and indicates the tokens that the client session requires the server version token list to have.
* If the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) variable is **NULL** (the default) or has an empty value, any server version token list matches. (In effect, an empty value disables matching requirements.)
* If the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) variable has a nonempty value, any mismatch between its value and the server version token list results in an error for any statement the session sends to the server. A mismatch occurs under these conditions:
  + A token name in the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value is not present in the server token list. In this case, an [**ER\_VTOKEN\_PLUGIN\_TOKEN\_NOT\_FOUND**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_vtoken_plugin_token_not_found) error occurs.
  + A token value in the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value differs from the value of the corresponding token in the server token list. In this case, an [**ER\_VTOKEN\_PLUGIN\_TOKEN\_MISMATCH**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_vtoken_plugin_token_mismatch) error occurs.

It is not a mismatch for the server version token list to include a token not named in the [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value.

Suppose that a management application has set the server token list as follows:

mysql> **SELECT version\_tokens\_set('tok1=a;tok2=b;tok3=c');**

+--------------------------------------------+

| version\_tokens\_set('tok1=a;tok2=b;tok3=c') |

+--------------------------------------------+

| 3 version tokens set. |

+--------------------------------------------+

A client registers the tokens it requires the server to match by setting its [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value. Then, for each subsequent statement sent by the client, the server checks its token list against the client [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value and produces an error if there is a mismatch:

mysql> **SET @@SESSION.version\_tokens\_session = 'tok1=a;tok2=b';**

mysql> **SELECT 1;**

+---+

| 1 |

+---+

| 1 |

+---+

mysql> **SET @@SESSION.version\_tokens\_session = 'tok1=b';**

mysql> **SELECT 1;**

ERROR 3136 (42000): Version token mismatch for tok1. Correct value a

The first [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) succeeds because the client tokens **tok1** and **tok2** are present in the server token list and each token has the same value in the server list. The second [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) fails because, although **tok1** is present in the server token list, it has a different value than specified by the client.

At this point, any statement sent by the client fails, unless the server token list changes such that it matches again. Suppose that the management application changes the server token list as follows:

mysql> **SELECT version\_tokens\_edit('tok1=b');**

+-------------------------------+

| version\_tokens\_edit('tok1=b') |

+-------------------------------+

| 1 version tokens updated. |

+-------------------------------+

mysql> **SELECT version\_tokens\_show();**

+-----------------------+

| version\_tokens\_show() |

+-----------------------+

| tok3=c;tok1=b;tok2=b; |

+-----------------------+

Now the client [**version\_tokens\_session**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session) value matches the server token list and the client can once again successfully execute statements:

mysql> **SELECT 1;**

+---+

| 1 |

+---+

| 1 |

+---+

* **[version\_tokens\_session\_number](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_version_tokens_session_number)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--version-tokens-session-number=#** |
| **System Variable** | [**version\_tokens\_session\_number**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_version_tokens_session_number) |
| **Scope** | Global, Session |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |

* This variable is for internal use.

### 5.6.7 The Clone Plugin

[5.6.7.1 Installing the Clone Plugin](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-installation)

[5.6.7.2 Cloning Data Locally](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-local)

[5.6.7.3 Cloning Remote Data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote)

[5.6.7.4 Cloning Encrypted Data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-encrypted-data)

[5.6.7.5 Cloning Compressed Data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-compressed-data)

[5.6.7.6 Cloning for Replication](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-replication)

[5.6.7.7 Directories and Files Created During a Cloning Operation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-directories)

[5.6.7.8 Remote Cloning Operation Failure Handling](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-failure-handling)

[5.6.7.9 Monitoring Cloning Operations](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring)

[5.6.7.10 Stopping a Cloning Operation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-stop)

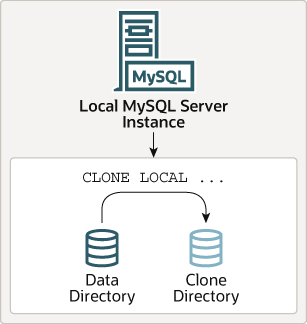
[5.6.7.11 Clone System Variable Reference](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-option-variable-reference)

[5.6.7.12 Clone System Variables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-options-variables)

[5.6.7.13 Clone Plugin Limitations](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-limitations)

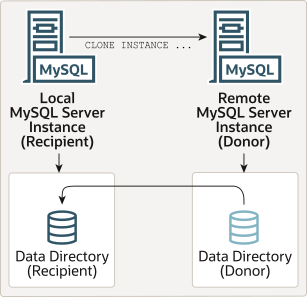
The clone plugin, introduced in MySQL 8.0.17, permits cloning data locally or from a remote MySQL server instance. Cloned data is a physical snapshot of data stored in **InnoDB** that includes schemas, tables, tablespaces, and data dictionary metadata. The cloned data comprises a fully functional data directory, which permits using the clone plugin for MySQL server provisioning.

**Figure 5.1 Local Cloning Operation**



A local cloning operation clones data from the MySQL server instance where the cloning operation is initiated to a directory on the same server or node where MySQL server instance runs.

**Figure 5.2 Remote Cloning Operation**



A remote cloning operation involves a local MySQL server instance (the “recipient”) where the cloning operation is initiated, and a remote MySQL server instance (the “donor”) where the source data is located. When a remote cloning operation is initiated on the recipient, cloned data is transferred over the network from the donor to the recipient. By default, a remote cloning operation removes the data in the recipient data directory and replaces it with the cloned data. Optionally, you can clone data to a different directory on the recipient to avoid removing existing data.

There is no difference with respect to data that is cloned by a local cloning operation as compared to a remote cloning operation. Both operations clone the same data.

The clone plugin supports replication. In addition to cloning data, a cloning operation extracts and transfers replication coordinates from the donor and applies them on the recipient, which enables using the clone plugin for provisioning Group Replication members and replicas. Using the clone plugin for provisioning is considerably faster and more efficient than replicating a large number of transactions (see [Section 5.6.7.6, “Cloning for Replication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-replication)). Group Replication members can also be configured to use the clone plugin as an alternative method of recovery, so that members automatically choose the most efficient way to retrieve group data from seed members. For more information, see [Section 18.5.3.2, “Cloning for Distributed Recovery”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#group-replication-cloning).

The clone plugin supports cloning of encrypted and page-compressed data. See [Section 5.6.7.4, “Cloning Encrypted Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-encrypted-data), and [Section 5.6.7.5, “Cloning Compressed Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-compressed-data).

The clone plugin must be installed before you can use it. For installation instructions, see [Section 5.6.7.1, “Installing the Clone Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-installation). For cloning instructions, see [Section 5.6.7.2, “Cloning Data Locally”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-local), and [Section 5.6.7.3, “Cloning Remote Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote).

Performance Schema tables and instrumentation are provided for monitoring cloning operations. See [Section 5.6.7.9, “Monitoring Cloning Operations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring).

#### 5.6.7.1 Installing the Clone Plugin

This section describes how to install and configure the clone plugin. For remote cloning operations, the clone plugin must be installed on the donor and recipient MySQL server instances.

For general information about installing or uninstalling plugins, see [Section 5.6.1, “Installing and Uninstalling Plugins”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-loading).

To be usable by the server, the plugin library file must be located in the MySQL plugin directory (the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable). If necessary, set the value of [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) at server startup to tell the server the plugin directory location.

The plugin library file base name is **mysql\_clone.so**. The file name suffix differs by platform (for example, .so for Unix and Unix-like systems, .dll for Windows).

To load the plugin at server startup, use the [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option to name the library file that contains it. With this plugin-loading method, the option must be given each time the server starts. For example, put these lines in your my.cnf file, adjusting the .so suffix for your platform as necessary:

[mysqld]

plugin-load-add=mysql\_clone.so

After modifying my.cnf, restart the server to cause the new settings to take effect.

**Note**

The [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) option cannot be used to load the clone plugin when restarting the server during an upgrade from a previous MySQL version. For example, after upgrading binaries or packages from MySQL 5.7 to MySQL 8.0, attempting to restart the server with [plugin-load-add=mysql\_clone.so](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add) causes this error: [ERROR] [MY-013238] [Server] Error installing plugin 'clone': Cannot install during upgrade. The workaround is to upgrade the server before attempting to start the server with [plugin-load-add=mysql\_clone.so](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add).

Alternatively, to load the plugin at runtime, use this statement, adjusting the .so suffix for your platform as necessary:

INSTALL PLUGIN clone SONAME 'mysql\_clone.so';

[**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) loads the plugin, and also registers it in the **mysql.plugins** system table to cause the plugin to be loaded for each subsequent normal server startup without the need for [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add).

To verify plugin installation, examine the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table or use the [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement (see [Section 5.6.2, “Obtaining Server Plugin Information”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-plugin-information)). For example:

mysql> **SELECT PLUGIN\_NAME, PLUGIN\_STATUS**

**FROM INFORMATION\_SCHEMA.PLUGINS**

**WHERE PLUGIN\_NAME = 'clone';**

+------------------------+---------------+

| PLUGIN\_NAME | PLUGIN\_STATUS |

+------------------------+---------------+

| clone | ACTIVE |

+------------------------+---------------+

If the plugin fails to initialize, check the server error log for clone or plugin-related diagnostic messages.

If the plugin has been previously registered with [**INSTALL PLUGIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#install-plugin) or is loaded with [--plugin-load-add](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_plugin-load-add), you can use the --clone option at server startup to control the plugin activation state. For example, to load the plugin at startup and prevent it from being removed at runtime, use these options:

[mysqld]

plugin-load-add=mysql\_clone.so

clone=FORCE\_PLUS\_PERMANENT

If you want to prevent the server from running without the clone plugin, use --clone with a value of **FORCE** or **FORCE\_PLUS\_PERMANENT** to force server startup to fail if the plugin does not initialize successfully.

For more information about plugin activation states, see [Controlling Plugin Activation State](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-plugin-activating).

#### 5.6.7.2 Cloning Data Locally

The clone plugin supports the following syntax for cloning data locally; that is, cloning data from the local MySQL data directory to another directory on the same server or node where the MySQL server instance runs:

CLONE LOCAL DATA DIRECTORY [=] '***clone\_dir***';

To use [**CLONE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) syntax, the clone plugin must be installed. For installation instructions, see [Section 5.6.7.1, “Installing the Clone Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-installation).

The [**BACKUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_backup-admin) privilege is required to execute [**CLONE LOCAL DATA DIRECTORY**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statements.

mysql> GRANT BACKUP\_ADMIN ON \*.\* TO '***clone\_user***';

where ***clone\_user*** is the MySQL user that performs the cloning operation. The user you select to perform the cloning operation can be any MySQL user with the [**BACKUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_backup-admin) privilege on \*.\*.

The following example demonstrates cloning data locally:

mysql> CLONE LOCAL DATA DIRECTORY = '***/path/to/clone\_dir***';

where ***/path/to/clone\_dir*** is the full path of the local directory that data is cloned to. An absolute path is required, and the specified directory (“***clone\_dir***”) must not exist, but the specified path must be an existent path. The MySQL server must have the necessary write access to create the directory.

**Note**

A local cloning operation does not support cloning of user-created tables or tablespaces that reside outside of the data directory. Attempting to clone such tables or tablespaces causes the following error: ERROR 1086 (HY000): File '***/path/to/tablespace\_name.ibd***' already exists. Cloning a tablespace with the same path as the source tablespace would cause a conflict and is therefore prohibited.

All other user-created **InnoDB** tables and tablespaces, the **InnoDB** system tablespace, redo logs, and undo tablespaces are cloned to the specified directory.

If desired, you can start the MySQL server on the cloned directory after the cloning operation is complete.

shell> mysqld\_safe --datadir=***clone\_dir***

where ***clone\_dir*** is the directory that data was cloned to.

For information about monitoring cloning operation status and progress, see [Section 5.6.7.9, “Monitoring Cloning Operations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring).

#### 5.6.7.3 Cloning Remote Data

The clone plugin supports the following syntax for cloning remote data; that is, cloning data from a remote MySQL server instance (the donor) and transferring it to the MySQL instance where the cloning operation was initiated (the recipient).

CLONE INSTANCE FROM '***user***'@'***host***':***port***

IDENTIFIED BY '***password***'

[DATA DIRECTORY [=] '***clone\_dir***']

[REQUIRE [NO] SSL];

where:

* ***user*** is the clone user on the donor MySQL server instance.
* ***password*** is the ***user*** password.
* ***host*** is the [**hostname**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_hostname) address of the donor MySQL server instance. Internet Protocol version 6 (IPv6) address format is not supported. An alias to the IPv6 address can be used instead. An IPv4 address can be used as is.
* ***port*** is the [**port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_port) number of the donor MySQL server instance. (The X Protocol port specified by [**mysqlx\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_port) is not supported. Connecting to the donor MySQL server instance through MySQL Router is also not supported.)
* **DATA DIRECTORY [=] '*clone\_dir*'** is an optional clause used to specify a directory on the recipient for the data you are cloning. Use this option if you do not want to remove existing data in the recipient data directory. An absolute path is required, and the directory must not exist. The MySQL server must have the necessary write access to create the directory.

When the optional **DATA DIRECTORY [=] '*clone\_dir*'** clause is not used, a cloning operation removes existing data in the recipient data directory, replaces it with the cloned data, and automatically restarts the server afterward.

* **[REQUIRE [NO] SSL]** explicitly specifies whether an encrypted connection is to be used or not when transferring cloned data over the network. An error is returned if the explicit specification cannot be satisfied. If an SSL clause is not specified, clone attempts to establish an encrypted connection by default, falling back to an insecure connection if the secure connection attempt fails. A secure connection is required when cloning encrypted data regardless of whether this clause is specified. For more information, see [Configuring an Encrypted Connection for Cloning](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote-ssl).

**Note**

By default, user-created **InnoDB** tables and tablespaces that reside in the data directory on the donor MySQL server instance are cloned to the data directory on the recipient MySQL server instance. If the **DATA DIRECTORY [=] '*clone\_dir*'** clause is specified, they are cloned to the specified directory.

User-created **InnoDB** tables and tablespaces that reside outside of the data directory on the donor MySQL server instance are cloned to the same path on the recipient MySQL server instance. An error is reported if a table or tablespace already exists.

By default, the **InnoDB** system tablespace, redo logs, and undo tablespaces are cloned to the same locations that are configured on the donor (as defined by [**innodb\_data\_home\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_home_dir) and [**innodb\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_file_path), [**innodb\_log\_group\_home\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_log_group_home_dir), and [**innodb\_undo\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_directory), respectively). If the **DATA DIRECTORY [=] '*clone\_dir*'** clause is specified, those tablespaces and logs are cloned to the specified directory.

##### Remote Cloning Prerequisites

To perform a cloning operation, the clone plugin must be active on both the donor and recipient MySQL server instances. For installation instructions, see [Section 5.6.7.1, “Installing the Clone Plugin”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-installation).

A MySQL user on the donor and recipient is required for executing the cloning operation (the “clone user”).

* On the donor, the clone user requires the [**BACKUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_backup-admin) privilege for accessing and transferring data from the donor, and for blocking DDL during the cloning operation.
* On the recipient, the clone user requires the [**CLONE\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_clone-admin) privilege for replacing recipient data, blocking DDL during the cloning operation, and automatically restarting the server. The [**CLONE\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_clone-admin) privilege includes [**BACKUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_backup-admin) and [**SHUTDOWN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_shutdown) privileges implicitly.

Instructions for creating the clone user and granting the required privileges are included in the remote cloning example that follows this prerequisite information.

The following prerequisites are checked when the [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement is executed:

* The donor and recipient must have the same MySQL server version. The clone plugin is supported in MYSQL 8.0.17 and higher.
* mysql> SHOW VARIABLES LIKE 'version';
* +---------------+--------+
* | Variable\_name | Value |
* +---------------+--------+
* | version | 8.0.17 |
* +---------------+--------+
* The donor and recipient MySQL server instances must run on the same operating system and platform. For example, if the donor instance runs on a Linux 64-bit platform, the recipient instance must also run on that platform. Refer to your operating system documentation for information about how to determine your operating system platform.
* The recipient must have enough disk space for the cloned data. By default, recipient data is removed prior to cloning the donor data, so you only require enough space for the donor data. If you clone to a named directory using the **DATA DIRECTORY** clause, you must have enough disk space for the existing recipient data and the cloned data. You can estimate the size of your data by checking the data directory size on your file system and the size of any tablespaces that reside outside of the data directory. When estimating data size on the donor, remember that only **InnoDB** data is cloned. If you store data in other storage engines, adjust your data size estimate accordingly.
* **InnoDB** permits creating some tablespace types outside of the data directory. If the donor MySQL server instance has tablespaces that reside outside of the data directory, the cloning operation must be able access those tablespaces. You can query the [**INFORMATION\_SCHEMA.FILES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-files-table) table to identify tablespaces that reside outside of the data directory. Files that reside outside of the data directory have a fully qualified path to a directory other than the data directory.

mysql> SELECT FILE\_NAME FROM INFORMATION\_SCHEMA.FILES;

* Plugins that are active on the donor, including any keyring plugin, must also be active on the recipient. You can identify active plugins by issuing a [**SHOW PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-plugins) statement or by querying the [**INFORMATION\_SCHEMA.PLUGINS**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-plugins-table) table.
* The donor and recipient must have the same MySQL server character set and collation. For information about MySQL server character set and collation configuration, see [Section 10.15, “Character Set Configuration”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\charset.html#charset-configuration).
* The same [**innodb\_page\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_page_size) and [**innodb\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_file_path) settings are required on the donor and recipient. The [**innodb\_data\_file\_path**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_data_file_path) setting on the donor and recipient must specify the same number of data files of an equivalent size. You can check variable settings using [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables) syntax.
* mysql> SHOW VARIABLES LIKE 'innodb\_page\_size';
* mysql> SHOW VARIABLES LIKE 'innodb\_data\_file\_path';
* If cloning encrypted or page-compressed data, the donor and recipient must have the same file system block size. For page-compressed data, the recipient file system must support sparse files and hole punching for hole punching to occur on the recipient. For information about these features and how to identify tables and tablespaces that use them, see [Section 5.6.7.4, “Cloning Encrypted Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-encrypted-data), and [Section 5.6.7.5, “Cloning Compressed Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-compressed-data). To determine your file system block size, refer to your operating system documentation.
* A secure connection is required if you are cloning encrypted data. See [Configuring an Encrypted Connection for Cloning](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote-ssl).
* The [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) setting on the recipient must include the host address of the donor MySQL server instance. You can only clone data from a host on the valid donor list. A MySQL user with the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege is required to configure this variable. Instructions for setting the [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) variable are provided in the remote cloning example that follows this section. You can check the [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) setting using [**SHOW VARIABLES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-variables) syntax.
* mysql> SHOW VARIABLES LIKE 'clone\_valid\_donor\_list';
* There must be no other cloning operation running. Only a single cloning operation is permitted at a time. To determine if a clone operation is running, query the [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) table. See [Monitoring Cloning Operations using Performance Schema Clone Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring-performance-schema-clone-tables).
* The clone plugin transfers data in 1MB packets plus metadata. The minimum required [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) value is therefore 2MB on the donor and the recipient MySQL server instances. A [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) value less than 2MB results in an error. Use the following query to check your [**max\_allowed\_packet**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_allowed_packet) setting:
* mysql> SHOW VARIABLES LIKE 'max\_allowed\_packet';

The following prerequisites also apply:

* Undo tablespace file names on the donor must be unique. When data is cloned to the recipient, undo tablespaces, regardless of their location on the donor, are cloned to the [**innodb\_undo\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_directory) location on the recipient or to the directory specified by the **DATA DIRECTORY [=] '*clone\_dir*'** clause, if used. Duplicate undo tablespace file names on the donor are not permitted for this reason. As of MySQL 8.0.18, an error is reported if duplicate undo tablespace file names are encountered during a cloning operation. Prior to MySQL 8.0.18, cloning undo tablespaces with the same file name could result in undo tablespace files being overwritten on the recipient.

To view undo tablespace file names on the donor to ensure that they are unique, query [**INFORMATION\_SCHEMA.FILES**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-files-table):

mysql> SELECT TABLESPACE\_NAME, FILE\_NAME FROM INFORMATION\_SCHEMA.FILES

WHERE FILE\_TYPE LIKE 'UNDO LOG';

For information about dropping and adding undo tablespace files, see [Section 15.6.3.4, “Undo Tablespaces”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-undo-tablespaces).

* By default, the recipient MySQL server instance is restarted (stopped and started) automatically after the data is cloned. For an automatic restart to occur, a monitoring process must be available on the recipient to detect server shutdowns. Otherwise, the cloning operation halts with the following error after the data is cloned, and the recipient MySQL server instance is shut down:

ERROR 3707 (HY000): Restart server failed (mysqld is not managed by supervisor process).

This error does not indicate a cloning failure. It means that the recipient MySQL server instance must be started again manually after the data is cloned. After starting the server manually, you can connect to the recipient MySQL server instance and check the Performance Schema clone tables to verify that the cloning operation completed successfully (see [Monitoring Cloning Operations using Performance Schema Clone Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring-performance-schema-clone-tables).) The [**RESTART**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart) statement has the same monitoring process requirement. For more information, see [Section 13.7.8.8, “RESTART Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#restart). This requirement is not applicable if cloning to a named directory using the **DATA DIRECTORY** clause, as an automatic restart is not performed in this case.

* Several variables control various aspects of a remote cloning operation. Before performing a remote cloning operation, review the variables and adjust settings as necessary to suit your computing environment. Clone variables are set on recipient MySQL server instance where the cloning operation is executed. See [Section 5.6.7.12, “Clone System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-options-variables).

##### Cloning Remote Data

The following example demonstrates cloning remote data. By default, a remote cloning operation removes the data in the recipient data directory, replaces it with the cloned data, and restarts the MySQL server afterward.

The example assumes that remote cloning prerequisites are met. See [Remote Cloning Prerequisites](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-remote-prerequisites).

1. Login to the donor MySQL server instance with an administrative user account.
   1. Create a clone user with the [**BACKUP\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_backup-admin) privilege.
   2. mysql> CREATE USER 'donor\_clone\_user'@'example.donor.host.com' IDENTIFIED BY '***password***';
   3. mysql> GRANT BACKUP\_ADMIN on \*.\* to 'donor\_clone\_user'@'example.donor.host.com';
   4. Install the clone plugin:
   5. mysql> INSTALL PLUGIN clone SONAME 'mysql\_clone.so';
2. Login to the recipient MySQL server instance with an administrative user account.
   1. Create a clone user with the [**CLONE\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_clone-admin) privilege.
   2. mysql> CREATE USER 'recipient\_clone\_user'@'example.recipient.host.com' IDENTIFIED BY '***password***';
   3. mysql> GRANT CLONE\_ADMIN on \*.\* to 'recipient\_clone\_user'@'example.recipient.host.com';
   4. Install the clone plugin:
   5. mysql> INSTALL PLUGIN clone SONAME 'mysql\_clone.so';
   6. Add the host address of the donor MySQL server instance to the [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) variable setting.

mysql> SET GLOBAL clone\_valid\_donor\_list = '***example.donor.host.com***:***3306***';

1. Log on to the recipient MySQL server instance as the clone user you created previously (**recipient\_clone\_user'@'example.recipient.host.com**) and execute the [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement.
2. mysql> CLONE INSTANCE FROM 'donor\_clone\_user'@'example.donor.host.com':3306
3. IDENTIFIED BY '***password***';

After the data is cloned, the MySQL server instance on the recipient is restarted automatically.

For information about monitoring cloning operation status and progress, see [Section 5.6.7.9, “Monitoring Cloning Operations”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring).

##### Cloning to a Named Directory

By default, a remote cloning operation removes the data in the recipient data directory and replaces it with the cloned data. By cloning to a named directory, you can avoid removing existing data from the recipient data directory.

The procedure for cloning to a named directory is the same procedure described in [Cloning Remote Data](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote-example) with one exception: The [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement must include the **DATA DIRECTORY** clause. For example:

mysql> CLONE INSTANCE FROM '***user***'@'***example.donor.host.com***':***3306***

IDENTIFIED BY '***password***'

DATA DIRECTORY = '***/path/to/clone\_dir***';

An absolute path is required, and the directory must not exist. The MySQL server must have the necessary write access to create the directory.

When cloning to a named directory, the recipient MySQL server instance is not restarted automatically after the data is cloned. If you want to restart the MySQL server on the named directory, you must do so manually:

shell> mysqld\_safe --datadir=***/path/to/clone\_dir***

where ***/path/to/clone\_dir*** is the path to the named directory on the recipient.

##### Configuring an Encrypted Connection for Cloning

You can configure an encrypted connection for remote cloning operations to protect data as it is cloned over the network. An encrypted connection is required by default when cloning encrypted data. (see [Section 5.6.7.4, “Cloning Encrypted Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-encrypted-data).)

The instructions that follow describe how to configure the recipient MySQL server instance to use an encrypted connection. It is assumed that the donor MySQL server instance is already configured to use encrypted connections. If not, refer to [Section 6.3.1, “Configuring MySQL to Use Encrypted Connections”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#using-encrypted-connections) for server-side configuration instructions.

To configure the recipient MySQL server instance to use an encrypted connection:

1. Make the client certificate and key files of the donor MySQL server instance available to the recipient host. Either distribute the files to the recipient host using a secure channel or place them on a mounted partition that is accessible to the recipient host. The client certificate and key files to make available include:
   * ca.pem

The self-signed certificate authority (CA) file.

* + client-cert.pem

The client public key certificate file.

* + client-key.pem

The client private key file.

1. Configure the following SSL options on the recipient MySQL server instance.
   * [**clone\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_ca)

Specifies the path to the self-signed certificate authority (CA) file.

* + [**clone\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_cert)

Specifies the path to the client public key certificate file.

* + [**clone\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_key)

Specifies the path to the client private key file.

1. For example:
2. clone\_ssl\_ca=/***path***/***to***/ca.pem
3. clone\_ssl\_cert=/***path***/***to***/client-cert.pem
4. clone\_ssl\_key=/***path***/***to***/client-key.pem
5. To require that an encrypted connection is used, include the **REQUIRE SSL** clause when issuing the [**CLONE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement on the recipient.
6. mysql> CLONE INSTANCE FROM '***user***'@'***example.donor.host.com***':***3306***
7. IDENTIFIED BY '***password***'
8. DATA DIRECTORY = '***/path/to/clone\_dir***'
9. REQUIRE SSL;

If an SSL clause is not specified, the clone plugin attempts to establish an encrypted connection by default, falling back to an unencrypted connection if the encrypted connection attempt fails.

**Note**

If you are cloning encrypted data, an encrypted connection is required by default regardless of whether the **REQUIRE SSL** clause is specified. Using **REQUIRE NO SSL** causes an error if you attempt to clone encrypted data.

#### 5.6.7.4 Cloning Encrypted Data

Cloning of encrypted data is supported. The following requirements apply:

* A secure connection is required when cloning remote data to ensure safe transfer of unencrypted tablespace keys over the network. Tablespace keys are decrypted at the donor before transport and re-encrypted at the recipient using the recipient master key. An error is reported if an encrypted connection is not available or the **REQUIRE NO SSL** clause is used in the [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement. For information about configuring an encrypted connection for cloning, see [Configuring an Encrypted Connection for Cloning](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote-ssl).
* When cloning data to a local data directory that uses a locally managed keyring, the same keyring must be used when starting the MySQL server on the clone directory.
* When cloning data to a remote data directory (the recipient directory) that uses a locally managed keyring, the recipient keyring must be used when starting the MySQL sever on the cloned directory.

**Note**

The [**innodb\_redo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_redo_log_encrypt) and [**innodb\_undo\_log\_encrypt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#sysvar_innodb_undo_log_encrypt) variable settings cannot be modified while a cloning operation is in progress.

For information about the data encryption feature, see [Section 15.13, “InnoDB Data-at-Rest Encryption”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-data-encryption).

#### 5.6.7.5 Cloning Compressed Data

Cloning of page-compressed data is supported. The following requirements apply when cloning remote data:

* The recipient file system must support sparse files and hole punching for hole punching to occur on the recipient.
* The donor and recipient file systems must have the same block size. If file system block sizes differ, an error similar to the following is reported: ERROR 3868 (HY000): Clone Configuration FS Block Size: Donor value: 114688 is different from Recipient value: 4096.

For information about the page compression feature, see [Section 15.9.2, “InnoDB Page Compression”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#innodb-page-compression).

#### 5.6.7.6 Cloning for Replication

The clone plugin supports replication. In addition to cloning data, a cloning operation extracts replication coordinates from the donor and transfers them to the recipient, which enables using the clone plugin for provisioning Group Replication members and replicas. Using the clone plugin for provisioning is considerably faster and more efficient than replicating a large number of transactions.

Group Replication members can also be configured to use the clone plugin as an option for distributed recovery, in which case joining members automatically choose the most efficient way to retrieve group data from existing group members. For more information, see [Section 18.5.3.2, “Cloning for Distributed Recovery”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#group-replication-cloning).

During the cloning operation, both the binary log position (filename, offset) and the [**gtid\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed) GTID set are extracted and transferred from the donor MySQL server instance to the recipient. This data permits initiating replication at a consistent position in the replication stream. The binary logs and relay logs, which are held in files, are not copied from the donor to the recipient. To initiate replication, the binary logs required for the recipient to catch up to the donor must not be purged between the time that the data is cloned and the time that replication is started. If the required binary logs are not available, a replication handshake error is reported. A cloned instance should therefore be added to a replication group without excessive delay to avoid required binary logs being purged or the new member lagging behind significantly, requiring more recovery time.

* Issue this query on a cloned MySQL server instance to check the binary log position that was transferred to the recipient:
* mysql> SELECT BINLOG\_FILE, BINLOG\_POSITION FROM performance\_schema.clone\_status;
* Issue this query on a cloned MySQL server instance to check the [**gtid\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed) GTID set that was transferred to the recipient:
* mysql> SELECT @@GLOBAL.GTID\_EXECUTED;

By default in MySQL 8.0, the replication metadata repositories are held in tables that are copied from the donor to the recipient during the cloning operation. The replication metadata repositories hold replication-related configuration settings that can be used to resume replication correctly after the cloning operation.

* In MySQL 8.0.17 and 8.0.18, only the table **mysql.slave\_master\_info** (the connection metadata repository) is copied.
* From MySQL 8.0.19, the tables **mysql.slave\_relay\_log\_info** (the applier metadata repository) and **mysql.slave\_worker\_info** (the applier worker metadata repository) are also copied.

For a list of what is included in each table, see [Section 17.2.4.2, “Replication Metadata Repositories”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replica-logs-status). Note that if the settings [**master\_info\_repository=FILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_master_info_repository) and [**relay\_log\_info\_repository=FILE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_relay_log_info_repository) are used on the server (which is not the default in MySQL 8.0 and is deprecated), the replication metadata repositories are not cloned; they are only cloned if **TABLE** is set.

To clone for replication, perform the following steps:

1. For a new group member for Group Replication, first configure the MySQL Server instance for Group Replication, following the instructions in [Section 18.2.1.6, “Adding Instances to the Group”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#group-replication-adding-instances). Also set up the prerequisites for cloning described in [Section 18.5.3.2, “Cloning for Distributed Recovery”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\group-replication.html#group-replication-cloning). When you issue [**START GROUP\_REPLICATION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#start-group-replication) on the joining member, the cloning operation is managed automatically by Group Replication, so you do not need to carry out the operation manually, and you do not need to perform any further setup steps on the joining member.
2. For a replica in a source/replica MySQL replication topology, first clone the data from the donor MySQL server instance to the recipient manually. The donor must be a source or replica in the replication topology. For cloning instructions, see [Section 5.6.7.3, “Cloning Remote Data”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-remote).
3. After the cloning operation completes successfully, if you want to use the same replication channels on the recipient MySQL server instance that were present on the donor, verify which of them can resume replication automatically in the source/replica MySQL replication topology, and which need to be set up manually.
   * For GTID-based replication, if the recipient is configured with [**gtid\_mode=ON**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_mode) and has cloned from a donor with [**gtid\_mode=ON**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_mode), **ON\_PERMISSIVE**, or **OFF\_PERMISSIVE**, the [**gtid\_executed**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_gtid_executed) GTID set from the donor is applied on the recipient. If the recipient is cloned from a replica already in the topology, replication channels on the recipient that use GTID auto-positioning can resume replication automatically after the cloning operation when the channel is started. You do not need to perform any manual setup if you just want to use these same channels.
   * For binary log file position based replication, if the recipient is at MySQL 8.0.17 or 8.0.18, the binary log position from the donor is not applied on the recipient, only recorded in the Performance Schema [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) table. Replication channels on the recipient that use binary log file position based replication must therefore be set up manually to resume replication after the cloning operation. Ensure that these channels are not configured to start replication automatically at server startup, as they do not yet have the binary log position and attempt to start replication from the beginning.
   * For binary log file position based replication, if the recipient is at MySQL 8.0.19 or above, the binary log position from the donor is applied on the recipient. Replication channels on the recipient that use binary log file position based replication automatically attempt to carry out the relay log recovery process, using the cloned relay log information, before restarting replication. For a single-threaded replica ([**slave\_parallel\_workers**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_workers) is set to 0), relay log recovery should succeed in the absence of any other issues, enabling the channel to resume replication with no further setup. For a multithreaded replica ([**slave\_parallel\_workers**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#sysvar_slave_parallel_workers) is greater than 0), relay log recovery is likely to fail because it cannot usually be completed automatically. In this case, an error message is issued, and you must set the channel up manually.
4. If you need to set up cloned replication channels manually, or want to use different replication channels on the recipient, the following instructions provide a summary and abbreviated examples for adding a recipient MySQL server instance to a replication topology. Also refer to the detailed instructions that apply to your replication setup.
   * To add a recipient MySQL server instance to a MySQL replication topology that uses GTID-based transactions as the replication data source, configure the instance as required, following the instructions in [Section 17.1.3.4, “Setting Up Replication Using GTIDs”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-gtids-howto). Add replication channels for the instance as shown in the following abbreviated example. The [**CHANGE REPLICATION SOURCE TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-replication-source-to) statement (from MySQL 8.0.23) or [**CHANGE MASTER TO**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#change-master-to) statement (before MySQL 8.0.23) must define the host address and port number of the source, and the **SOURCE\_AUTO\_POSITION** | **MASTER\_AUTO\_POSITION** option should be enabled, as shown:
   * mysql> CHANGE MASTER TO MASTER\_HOST = '***source\_host\_name***', MASTER\_PORT = ***source\_port\_num***,
   * ...
   * MASTER\_AUTO\_POSITION = 1,
   * FOR CHANNEL '***setup\_channel***';
   * mysql> START SLAVE USER = '***user\_name***' PASSWORD = '***password***' FOR CHANNEL '***setup\_channel***';
   * Or from MySQL 8.0.22 and 8.0.23:
   * mysql> CHANGE SOURCE TO SOURCE\_HOST = '***source\_host\_name***', SOURCE\_PORT = ***source\_port\_num***,
   * ...
   * SOURCE\_AUTO\_POSITION = 1,
   * FOR CHANNEL '***setup\_channel***';
   * mysql> START REPLICA USER = '***user\_name***' PASSWORD = '***password***' FOR CHANNEL '***setup\_channel***';
   * To add a recipient MySQL server instance to a MySQL replication topology that uses binary log file position based replication, configure the instance as required, following the instructions in [Section 17.1.2, “Setting Up Binary Log File Position Based Replication”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\replication.html#replication-howto). Add replication channels for the instance as shown in the following abbreviated example, using the binary log position that was transferred to the recipient during the cloning operation:
   * mysql> SELECT BINLOG\_FILE, BINLOG\_POSITION FROM performance\_schema.clone\_status;
   * mysql> CHANGE MASTER TO MASTER\_HOST = '***source\_host\_name***', MASTER\_PORT = ***source\_port\_num***,
   * ...
   * MASTER\_LOG\_FILE = '***source\_log\_name***',
   * MASTER\_LOG\_POS = ***source\_log\_pos***,
   * FOR CHANNEL '***setup\_channel***';
   * mysql> START SLAVE USER = '***user\_name***' PASSWORD = '***password***' FOR CHANNEL '***setup\_channel***';
   * Or from MySQL 8.0.22 and 8.0.23:
   * mysql> SELECT BINLOG\_FILE, BINLOG\_POSITION FROM performance\_schema.clone\_status;
   * mysql> CHANGE SOURCE TO SOURCE\_HOST = '***source\_host\_name***', SOURCE\_PORT = ***source\_port\_num***,
   * ...
   * SOURCE\_LOG\_FILE = '***source\_log\_name***',
   * SOURCE\_LOG\_POS = ***source\_log\_pos***,
   * FOR CHANNEL '***setup\_channel***';
   * mysql> START REPLICA USER = '***user\_name***' PASSWORD = '***password***' FOR CHANNEL '***setup\_channel***';

#### 5.6.7.7 Directories and Files Created During a Cloning Operation

When data is cloned, the following directories and files are created for internal use. They should not be modified.

* #clone: Contains internal clone files used by the cloning operation. Created in the directory that data is cloned to.
* #ib\_archive: Contains internally archived log files, archived on the donor during the cloning operation.
* \*.#clone files: Temporary data files created on the recipient while the existing data directory is replaced by a remote cloning operation.

#### 5.6.7.8 Remote Cloning Operation Failure Handling

This section describes failure handing at different stages of a cloning operation.

1. Prerequisites are checked (see [Remote Cloning Prerequisites](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-remote-prerequisites)).
   * If a failure occurs during the prerequisite check, the [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) operation reports an error.
2. A backup lock is taken to block DDL operations.
   * If the cloning operation is unable to obtain a DDL lock within the time limit specified by the [**clone\_ddl\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ddl_timeout) variable, an error is reported.
3. User-created data (schemas, tables, tablespaces) and binary logs on the recipient are removed before data is cloned to the recipient data directory.
   * When user created data is removed from the recipient during a remote cloning operation, existing data in the recipient data directory is not saved and may be lost if a failure occurs. If the data to be replaced on the recipient is of importance, a backup should be taken before initiating a remote cloning operation.

For informational purposes, warnings are printed to the server error log to specify when data removal starts and finishes:

[Warning] [MY-013453] [InnoDB] Clone removing all user data for provisioning:

Started...

[Warning] [MY-013453] [InnoDB] Clone removing all user data for provisioning:

Finished

If a failure occurs while removing data, the recipient may be left with a partial set of schemas, tables, and tablespaces that existed before the cloning operation. Any time during the execution of a cloning operation or after a failure, the server is always in a consistent state.

1. Data is cloned from the donor. User-created data, dictionary metadata, and other system data are cloned.
   * If a failure occurs while cloning data, the cloning operation is rolled back and all cloned data removed. At this stage, the previously existing data on the recipient has also been removed, which leaves the recipient with no user data.

Should this scenario occur, you can either rectify the cause of the failure and re-execute the cloning operation, or forgo the cloning operation and restore the recipient data from a backup taken before the cloning operation.

1. The server is restarted automatically (applies to remote cloning operations that do not clone to a named directory). During startup, typical server startup tasks are performed.
   * If the automatic server restart fails, you can restart the server manually to complete the cloning operation.

Before MySQL 8.0.24, if a network error occurs during a cloning operation, the operation resumes if the error is resolved within five minutes. From MySQL 8.0.24, the operation resumes if the error is resolved within the time specified by the [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) variable defined on the donor instance. The [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) default setting is 5 minutes but a range of 0 to 30 minutes is supported. If the operation does not resume within the allotted time, it aborts and returns an error, and the donor drops the snapshot. A setting of zero causes the donor to drop the snapshot immediately when a network error occurs. Configuring a longer timeout allows more time for resolving network issues but also increases the size of the delta on the donor instance, which increases clone recovery time as well as replication lag in cases where the clone is intended as a replica or replication group member.

Prior to MySQL 8.0.24, donor threads use the MySQL Server [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) setting when listening for Clone protocol commands. As a result, a low [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) setting could cause a long running remote cloning operation to timeout. From MySQL 8.0.24, the Clone idle timeout is set to the default [**wait\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_wait_timeout) setting, which is 28800 seconds (8 hours).

#### 5.6.7.9 Monitoring Cloning Operations

This section describes options for monitoring cloning operations.

* [Monitoring Cloning Operations using Performance Schema Clone Tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring-performance-schema-clone-tables)
* [Monitoring Cloning Operations Using Performance Schema Stage Events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring-stage-events)
* [Monitoring Cloning Operations Using Performance Schema Clone Instrumentation](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-performance-schema-instruments)
* [The Com\_clone Status Variable](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-com-clone)

##### Monitoring Cloning Operations using Performance Schema Clone Tables

A cloning operation may take some time to complete, depending on the amount of data and other factors related to data transfer. You can monitor the status and progress of a cloning operation on the recipient MySQL server instance using the [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) and [**clone\_progress**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-progress-table) Performance Schema tables.

**Note**

The [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) and [**clone\_progress**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-progress-table) Performance Schema tables can be used to monitor a cloning operation on the recipient MySQL server instance only. To monitor a cloning operation on the donor MySQL server instance, use the clone stage events, as described in [Monitoring Cloning Operations Using Performance Schema Stage Events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring-stage-events).

* The [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) table provides the state of the current or last executed cloning operation. A clone operation has four possible states: **Not Started**, **In Progress**, **Completed**, and **Failed**.
* The [**clone\_progress**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-progress-table) table provides progress information for the current or last executed clone operation, by stage. The stages of a cloning operation include **DROP DATA**, **FILE COPY**, **PAGE\_COPY**, **REDO\_COPY**, **FILE\_SYNC**, **RESTART**, and **RECOVERY**.

The [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_select) and [**EXECUTE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_execute) privileges on the Performance Schema is required to access the Performance Schema clone tables.

To check the state of a cloning operation:

1. Connect to the recipient MySQL server instance.
2. Query the [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) table:
3. mysql> **SELECT STATE FROM performance\_schema.clone\_status;**
4. +-----------+
5. | STATE |
6. +-----------+
7. | Completed |
8. +-----------+

Should a failure occur during a cloning operation, you can query the [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) table for error information:

mysql> **SELECT STATE, ERROR\_NO, ERROR\_MESSAGE FROM performance\_schema.clone\_status;**

+-----------+----------+---------------+

| STATE | ERROR\_NO | ERROR\_MESSAGE |

+-----------+----------+---------------+

| Failed | xxx | "xxxxxxxxxxx" |

+-----------+----------+---------------+

To review the details of each stage of a cloning operation:

1. Connect to the recipient MySQL server instance.
2. Query the [**clone\_progress**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-progress-table) table. For example, the following query provides state and end time data for each stage of the cloning operation:
3. mysql> **SELECT STAGE, STATE, END\_TIME FROM performance\_schema.clone\_progress;**
4. +-----------+-----------+----------------------------+
5. | stage | state | end\_time |
6. +-----------+-----------+----------------------------+
7. | DROP DATA | Completed | 2019-01-27 22:45:43.141261 |
8. | FILE COPY | Completed | 2019-01-27 22:45:44.457572 |
9. | PAGE COPY | Completed | 2019-01-27 22:45:44.577330 |
10. | REDO COPY | Completed | 2019-01-27 22:45:44.679570 |
11. | FILE SYNC | Completed | 2019-01-27 22:45:44.918547 |
12. | RESTART | Completed | 2019-01-27 22:45:48.583565 |
13. | RECOVERY | Completed | 2019-01-27 22:45:49.626595 |
14. +-----------+-----------+----------------------------+

For other clone status and progress data points that you can monitor, refer to [Section 27.12.19, “Performance Schema Clone Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-tables).

##### Monitoring Cloning Operations Using Performance Schema Stage Events

A cloning operation may take some time to complete, depending on the amount of data and other factors related to data transfer. There are three stage events for monitoring the progress of a cloning operation. Each stage event reports **WORK\_COMPLETED** and **WORK\_ESTIMATED** values. Reported values are revised as the operation progresses.

This method of monitoring a cloning operation can be used on the donor or recipient MySQL server instance.

In order of occurrence, cloning operation stage events include:

* **stage/innodb/clone (file copy)**: Indicates progress of the file copy phase of the cloning operation. **WORK\_ESTIMATED** and **WORK\_COMPLETED** units are file chunks. The number of files to be transferred is known at the start of the file copy phase, and the number of chunks is estimated based on the number of files. **WORK\_ESTIMATED** is set to the number of estimated file chunks. **WORK\_COMPLETED** is updated after each chunk is sent.
* **stage/innodb/clone (page copy)**: Indicates progress of the page copy phase of cloning operation. **WORK\_ESTIMATED** and **WORK\_COMPLETED** units are pages. Once the file copy phase is completed, the number of pages to be transferred is known, and **WORK\_ESTIMATED** is set to this value. **WORK\_COMPLETED** is updated after each page is sent.
* **stage/innodb/clone (redo copy)**: Indicates progress of the redo copy phase of cloning operation. **WORK\_ESTIMATED** and **WORK\_COMPLETED** units are redo chunks. Once the page copy phase is completed, the number of redo chunks to be transferred is known, and **WORK\_ESTIMATED** is set to this value. **WORK\_COMPLETED** is updated after each chunk is sent.

The following example demonstrates how to enable **stage/innodb/clone%** event instruments and related consumer tables to monitor a cloning operation. For information about Performance Schema stage event instruments and related consumers, see [Section 27.12.5, “Performance Schema Stage Event Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-stage-tables).

1. Enable the **stage/innodb/clone%** instruments:
2. mysql> **UPDATE performance\_schema.setup\_instruments SET ENABLED = 'YES'**
3. **WHERE NAME LIKE 'stage/innodb/clone%';**
4. Enable the stage event consumer tables, which include [**events\_stages\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-current-table), [**events\_stages\_history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-history-table), and [**events\_stages\_history\_long**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-history-long-table).
5. mysql> **UPDATE performance\_schema.setup\_consumers SET ENABLED = 'YES'**
6. **WHERE NAME LIKE '%stages%';**
7. Run a cloning operation. In this example, a local data directory is cloned to a directory named **cloned\_dir**.
8. mysql> **CLONE LOCAL DATA DIRECTORY = '/path/to/cloned\_dir';**
9. Check the progress of the cloning operation by querying the Performance Schema [**events\_stages\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-current-table) table. The stage event shown differs depending on the cloning phase that is in progress. The **WORK\_COMPLETED** column shows the work completed. The **WORK\_ESTIMATED** column shows the work required in total.
10. mysql> **SELECT EVENT\_NAME, WORK\_COMPLETED, WORK\_ESTIMATED FROM performance\_schema.events\_stages\_current**
11. **WHERE EVENT\_NAME LIKE 'stage/innodb/clone%';**
12. +--------------------------------+----------------+----------------+
13. | EVENT\_NAME | WORK\_COMPLETED | WORK\_ESTIMATED |
14. +--------------------------------+----------------+----------------+
15. | stage/innodb/clone (redo copy) | 1 | 1 |
16. +--------------------------------+----------------+----------------+

The [**events\_stages\_current**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-current-table) table returns an empty set if the cloning operation has finished. In this case, you can check the [**events\_stages\_history**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-events-stages-history-table) table to view event data for the completed operation. For example:

mysql> **SELECT EVENT\_NAME, WORK\_COMPLETED, WORK\_ESTIMATED FROM events\_stages\_history**

**WHERE EVENT\_NAME LIKE 'stage/innodb/clone%';**

+--------------------------------+----------------+----------------+

| EVENT\_NAME | WORK\_COMPLETED | WORK\_ESTIMATED |

+--------------------------------+----------------+----------------+

| stage/innodb/clone (file copy) | 301 | 301 |

| stage/innodb/clone (page copy) | 0 | 0 |

| stage/innodb/clone (redo copy) | 1 | 1 |

+--------------------------------+----------------+----------------+

##### Monitoring Cloning Operations Using Performance Schema Clone Instrumentation

[Performance Schema](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\performance-schema.html" \o "Chapter 27 MySQL Performance Schema) provides instrumentation for advanced performance monitoring of clone operations. To view the available clone instrumentation, issue the following query:

mysql> **SELECT \* FROM performance\_schema.setup\_instruments**

**WHERE NAME LIKE WHERE NAME LIKE '%clone%';**

+----------------------------------------------+---------+

| NAME | ENABLED |

+----------------------------------------------+---------+

| wait/synch/mutex/innodb/clone\_snapshot\_mutex | NO |

| wait/synch/mutex/innodb/clone\_sys\_mutex | NO |

| wait/synch/mutex/innodb/clone\_task\_mutex | NO |

| wait/io/file/innodb/innodb\_clone\_file | YES |

| stage/innodb/clone (file copy) | YES |

| stage/innodb/clone (redo copy) | YES |

| stage/innodb/clone (page copy) | YES |

| statement/abstract/clone | YES |

| statement/clone/local | YES |

| statement/clone/client | YES |

| statement/clone/server | YES |

| memory/innodb/clone | YES |

| memory/clone/data | YES |

+----------------------------------------------+---------+

###### Wait Instruments

Performance schema wait instruments track events that take time. Clone wait event instruments include:

* **wait/synch/mutex/innodb/clone\_snapshot\_mutex**: Tracks wait events for the clone snapshot mutex, which synchronizes access to the dynamic snapshot object (on the donor and recipient) between multiple clone threads.
* **wait/synch/mutex/innodb/clone\_sys\_mutex**: Tracks wait events for the clone sys mutex. There is one clone system object in a MySQL server instance. This mutex synchronizes access to the clone system object on the donor and recipient. It is acquired by clone threads and other foreground and background threads.
* **wait/synch/mutex/innodb/clone\_task\_mutex**: Tracks wait events for the clone task mutex, used for clone task management. The **clone\_task\_mutex** is acquired by clone threads.
* **wait/io/file/innodb/innodb\_clone\_file**: Tracks all I/O wait operations for files that clone operates on.

For information about monitoring **InnoDB** mutex waits, see [Section 15.16.2, “Monitoring InnoDB Mutex Waits Using Performance Schema”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\innodb-storage-engine.html#monitor-innodb-mutex-waits-performance-schema). For information about monitoring wait events in general, see [Section 27.12.4, “Performance Schema Wait Event Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-wait-tables).

###### Stage Instruments

Performance Schema stage events track steps that occur during the statement-execution process. Clone stage event instruments include:

* **stage/innodb/clone (file copy)**: Indicates progress of the file copy phase of the cloning operation.
* **stage/innodb/clone (redo copy)**: Indicates progress of the redo copy phase of cloning operation.
* **stage/innodb/clone (page copy)**: Indicates progress of the page copy phase of cloning operation.

For information about monitoring cloning operations using stage events, see [Monitoring Cloning Operations Using Performance Schema Stage Events](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-monitoring-stage-events). For general information about monitoring stage events, see [Section 27.12.5, “Performance Schema Stage Event Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-stage-tables).

###### Statement Instruments

Performance Schema statement events track statement execution. When a clone operation is initiated, the different statement types tracked by clone statement instruments may be executed in parallel. You can observe these statement events in the Performance Schema statement event tables. The number of statements that execute depends on the [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) and [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) settings.

Clone statement event instruments include:

* **statement/abstract/clone**: Tracks statement events for any clone operation before it is classified as a local, client, or server operation type.
* **statement/clone/local**: Tracks clone statement events for local clone operations; generated when executing a [**CLONE LOCAL**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement.
* **statement/clone/client**: Tracks remote cloning statement events that occur on the recipient MySQL server instance; generated when executing a [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement on the recipient.
* **statement/clone/server**: Tracks remote cloning statement events that occur on the donor MySQL server instance; generated when executing a [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement on the recipient.

For information about monitoring Performance Schema statement events, see [Section 27.12.6, “Performance Schema Statement Event Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-statement-tables).

###### Memory Instruments

Performance Schema memory instruments track memory usage. Clone memory usage instruments include:

* **memory/innodb/clone**: Tracks memory allocated by **InnoDB** for the dynamic snapshot.
* **memory/clone/data**: Tracks memory allocated by the clone plugin during a clone operation.

For information about monitoring memory usage using Performance Schema, see [Section 27.12.20.10, “Memory Summary Tables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-memory-summary-tables).

##### The Com\_clone Status Variable

The [**Com\_clone**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) status variable provides a count of [**CLONE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement executions.

For more information, refer to the discussion about [**Com\_xxx**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#statvar_Com_xxx) statement counter variables in [Section 5.1.10, “Server Status Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-status-variables).

#### 5.6.7.10 Stopping a Cloning Operation

If necessary, you can stop a cloning operation with a [**KILL QUERY *processlist\_id***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#kill) statement.

On the recipient MySQL server instance, you can retrieve the processlist identifier (PID) for a cloning operation from the **PID** column of the [**clone\_status**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-clone-status-table) table.

mysql> SELECT \* FROM performance\_schema.clone\_status\G

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ID: 1

PID: 8

STATE: In Progress

BEGIN\_TIME: 2019-07-15 11:58:36.767

END\_TIME: NULL

SOURCE: LOCAL INSTANCE

DESTINATION: /***path/to/clone\_dir***/

ERROR\_NO: 0

ERROR\_MESSAGE:

BINLOG\_FILE:

BINLOG\_POSITION: 0

GTID\_EXECUTED:

You can also retrieve the processlist identifier from the **ID** column of the **INFORMATION\_SCHEMA** [**PROCESSLIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\information-schema.html#information-schema-processlist-table) table, the **Id** column of [**SHOW PROCESSLIST**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#show-processlist) output, or the **PROCESSLIST\_ID** column of the Performance Schema [**threads**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-threads-table) table. These methods of obtaining the PID information can be used on the donor or recipient MySQL server instance.

#### 5.6.7.11 Clone System Variable Reference

**Table 5.6 Clone System Variable Reference**

| **Name** | **Cmd-Line** | **Option File** | **System Var** | **Status Var** | **Var Scope** | **Dynamic** |
| --- | --- | --- | --- | --- | --- | --- |
| [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_buffer_size) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ddl\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ddl_timeout) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_enable\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_enable_compression) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_max\_network\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_network_bandwidth) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_ca) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_cert) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_key) | Yes | Yes | Yes |  | Global | Yes |
| [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) | Yes | Yes | Yes |  | Global | Yes |

#### 5.6.7.12 Clone System Variables

This section describes the system variables that control operation of the clone plugin. If values specified at startup are incorrect, the clone plugin may fail to initialize properly and the server does not load it. In this case, the server may also produce error messages for other clone settings because it does not recognize them.

Each system variable has a default value. System variables can be set at server startup using options on the command line or in an option file. They can be changed dynamically at runtime using the [**SET**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\data-types.html#set) statement, which enables you to modify operation of the server without having to stop and restart it.

Setting a global system variable runtime value normally requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege (or the deprecated [**SUPER**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_super) privilege). For more information, see [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

Clone variables are configured on the recipient MySQL server instance where the cloning operation is executed.

* **[clone\_autotune\_concurrency](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_autotune_concurrency)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-autotune-concurrency** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* When [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) is enabled (the default), additional threads for remote cloning operations are spawned dynamically to optimize data transfer speed. The setting is applicable to recipient MySQL server instance only.
* During a cloning operation, the number of threads increases incrementally toward a target of double the current thread count. The effect on the data transfer speed is evaluated at each increment. The process either continues or stops according to the following rules:
  + If the data transfer speed degrades more than 5% with an incremental increase, the process stops.
  + If there is at least a 5% improvement after reaching 25% of the target, the process continues. Otherwise, the process stops.
  + If there is at least a 10% improvement after reaching 50% of the target, the process continues. Otherwise, the process stops.
  + If there is at least a 25% improvement after reaching the target, the process continues toward a new target of double the current thread count. Otherwise, the process stops.

The autotuning process does not support decreasing the number of threads.

The [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) variable defines the maximum number of threads that can be spawned.

If [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) is disabled, [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) defines the number of threads spawned for a remote cloning operation.

* **[clone\_buffer\_size](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_buffer_size)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-buffer-size** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_buffer\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_buffer_size) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **4194304** |
| **Minimum Value** | **1048576** |
| **Maximum Value** | **268435456** |
| **Unit** | **bytes** |

* Defines the size of the intermediate buffer used when transferring data during a local cloning operation. The default value is 4 mebibytes (MiB). A larger buffer size may permit I/O device drivers to fetch data in parallel, which can improve cloning performance.

* **[clone\_ddl\_timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_ddl_timeout)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-ddl-timeout** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_ddl\_timeout**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ddl_timeout) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **300** |
| **Minimum Value** | **0** |
| **Maximum Value** | **2592000** |
| **Unit** | **seconds** |

* The time in seconds to wait for a backup lock when executing a cloning operation. This setting is applied on both the donor and recipient MySQL server instances. A cloning operation cannot run concurrently with DDL operations. A backup lock is required on the donor and recipient MySQL server instances. The cloning operation waits for current DDL operations to finish. Once backup locks are acquired, DDL operations must wait for the cloning operation to finish. A value of 0 means that no backup lock is to be taken for the cloning operation. In this case, the cloning operation fails with an error if a DDL operation is attempted concurrently.

* **[clone\_donor\_timeout\_after\_network\_failure](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_donor_timeout_after_network_failure)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-donor-timeout-after-network-failure** |
| **Introduced** | 8.0.24 |
| **System Variable** | [**clone\_donor\_timeout\_after\_network\_failure**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_donor_timeout_after_network_failure) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **5** |
| **Minimum Value** | **0** |
| **Maximum Value** | **30** |
| **Unit** | **minutes** |

* Defines the amount of time in minutes the donor allows for the recipient to reconnect and restart a cloning operation after a network failure. For more information, see [Section 5.6.7.8, “Remote Cloning Operation Failure Handling”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#clone-plugin-failure-handling).
* This variable is set on the donor MySQL server instance. Setting it on the recipient MySQL server instance has no effect.

* **[clone\_enable\_compression](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_enable_compression)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-enable-compression** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_enable\_compression**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_enable_compression) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Enables compression of data at the network layer during a remote cloning operation. Compression saves network bandwidth at the cost of CPU. Enabling compression may improve the data transfer rate. This setting is only applied on the recipient MySQL server instance.

* **[clone\_max\_concurrency](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_max_concurrency)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-max-concurrency** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **16** |
| **Minimum Value** | **1** |
| **Maximum Value** | **128** |

* Defines the maximum number of concurrent threads for a remote cloning operation. The default value is 16. A greater number of threads can improve cloning performance but also reduces the number of permitted simultaneous client connections, which can affect the performance of existing client connections. This setting is only applied on the recipient MySQL server instance.
* If [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) is enabled (the default), [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) is the maximum number of threads that can be dynamically spawned for a remote cloning operation. If [**clone\_autotune\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_autotune_concurrency) is disabled, [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) defines the number of threads spawned for a remote cloning operation.
* A minimum data transfer rate of 1 mebibyte (MiB) per thread is recommended for remote cloning operations. The data transfer rate for a remote cloning operation is controlled by the [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) variable.

* **[clone\_max\_data\_bandwidth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_max_data_bandwidth)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-max-data-bandwidth** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1048576** |
| **Unit** | **miB/second** |

* Defines the maximum data transfer rate in mebibytes (MiB) per second for a remote cloning operation. This variable helps manage the performance impact of a cloning operation. A limit should be set only when donor disk I/O bandwidth is saturated, affecting performance. A value of 0 means “unlimited”, which permits cloning operations to run at the highest possible data transfer rate. This setting is only applicable to the recipient MySQL server instance.
* The minimum data transfer rate is 1 MiB per second, per thread. For example, if there are 8 threads, the minimum transfer rate is 8 MiB per second. The [**clone\_max\_concurrency**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_concurrency) variable controls the maximum number threads spawned for a remote cloning operation.
* The requested data transfer rate specified by [**clone\_max\_data\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_data_bandwidth) may differ from the actual data transfer rate reported by the **DATA\_SPEED** column in the **performance\_schema.clone\_progress** table. If your cloning operation is not achieving the desired data transfer rate and you have available bandwidth, check I/O usage on the recipient and donor. If there is underutilized bandwidth, I/O is the next mostly likely bottleneck.

* **[clone\_max\_network\_bandwidth](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_max_network_bandwidth)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-max-network-bandwidth** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_max\_network\_bandwidth**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_max_network_bandwidth) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Integer |
| **Default Value** | **0** |
| **Minimum Value** | **0** |
| **Maximum Value** | **1048576** |
| **Unit** | **miB/second** |

* Specifies the maximum approximate network transfer rate in mebibytes (MiB) per second for a remote cloning operation. This variable can be used to manage the performance impact of a cloning operation on network bandwidth. It should be set only when network bandwidth is saturated, affecting performance on the donor instance. A value of 0 means “unlimited”, which permits cloning at the highest possible data transfer rate over the network, providing the best performance. This setting is only applicable to the recipient MySQL server instance.

* **[clone\_ssl\_ca](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_ssl_ca)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-ssl-ca=file\_name** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**clone\_ssl\_ca**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_ca) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **empty string** |

* Specifies the path to the certificate authority (CA) file. Used to configure an encrypted connection for a remote cloning operation. This setting configured on the recipient and used when connecting to the donor.

* **[clone\_ssl\_cert](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_ssl_cert)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-ssl-cert=file\_name** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**clone\_ssl\_cert**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_cert) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **empty string** |

* Specifies the path to the public key certificate. Used to configure an encrypted connection for a remote cloning operation. This setting configured on the recipient and used when connecting to the donor.

* **[clone\_ssl\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_ssl_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-ssl-key=file\_name** |
| **Introduced** | 8.0.14 |
| **System Variable** | [**clone\_ssl\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_ssl_key) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **empty string** |

* Specifies the path to the private key file. Used to configure an encrypted connection for a remote cloning operation. This setting configured on the recipient and used when connecting to the donor.

* **[clone\_valid\_donor\_list](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_clone_valid_donor_list)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--clone-valid-donor-list=value** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) |
| **Scope** | Global |
| **Dynamic** | Yes |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | String |
| **Default Value** | **NULL** |

* Defines valid donor host addresses for remote cloning operations. This setting is applied on the recipient MySQL server instance. A comma-separated list of values is permitted in the following format: “**HOST1:PORT1,HOST2:PORT2,HOST3:PORT3**”. Spaces are not permitted.
* The [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) variable adds a layer of security by providing control over the sources of cloned data. The privilege required to configure [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) is different from the privilege required to execute remote cloning operations, which permits assigning those responsibilities to different roles. Configuring [**clone\_valid\_donor\_list**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_clone_valid_donor_list) requires the [**SYSTEM\_VARIABLES\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_system-variables-admin) privilege, whereas executing a remote cloning operation requires the [**CLONE\_ADMIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_clone-admin) privilege.
* Internet Protocol version 6 (IPv6) address format is not supported. Internet Protocol version 6 (IPv6) address format is not supported. An alias to the IPv6 address can be used instead. An IPv4 address can be used as is.

#### 5.6.7.13 Clone Plugin Limitations

The clone plugin is subject to these limitations:

* DDL, including [**TRUNCATE TABLE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#truncate-table), is not permitted during a cloning operation. This limitation should be considered when selecting data sources. A workaround is to use dedicated donor instances, which can accommodate DDL operations being blocked while data is cloned. Concurrent DML is permitted.
* An instance cannot be cloned from a different MySQL server version or release. The donor and recipient must have exactly the same MySQL server version and release. For example, you cannot clone between MySQL 5.7 and MySQL 8.0, or between MySQL 8.0.19 and MySQL 8.0.20. The clone plugin is only supported in MySQL 8.0.17 and higher.
* Only a single MySQL instance can be cloned at a time. Cloning multiple MySQL instances in a single cloning operation is not supported.
* The X Protocol port specified by [**mysqlx\_port**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\document-store.html#sysvar_mysqlx_port) is not supported for remote cloning operations (when specifying the port number of the donor MySQL server instance in a [**CLONE INSTANCE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#clone) statement).
* The clone plugin does not support cloning of MySQL server configurations. The recipient MySQL server instance retains its configuration, including persisted system variable settings (see [Section 5.1.9.3, “Persisted System Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#persisted-system-variables).)
* The clone plugin does not support cloning of binary logs.
* The clone plugin only clones data stored in **InnoDB**. Other storage engine data is not cloned. [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) and [**CSV**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#csv-storage-engine) tables stored in any schema including the **sys** schema are cloned as empty tables.
* Connecting to the donor MySQL server instance through MySQL Router is not supported.
* Local cloning operations do not support cloning of general tablespaces that were created with an absolute path. A cloned tablespace file with the same path as the source tablespace file would cause a conflict.

### 5.6.8 The Keyring Proxy Bridge Plugin

MySQL Keyring originally implemented keystore capabilities using server plugins, but began transitioning to use the component infrastructure in MySQL 8.0.24. The transition includes revising the underlying implementation of keyring plugins use the component infrastructure. This is facilitated using the plugin named **daemon\_keyring\_proxy\_plugin** that acts as a bridge between the plugin and component service APIs, and enables keyring plugins to continue to be used with no change to user-visible characteristics.

**daemon\_keyring\_proxy\_plugin** is built in and nothing need be done to install or enable it.

### 5.6.9 MySQL Plugin Services

[5.6.9.1 The Locking Service](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service)

[5.6.9.2 The Keyring Service](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#keyring-service)

MySQL server plugins have access to server “plugin services.” The plugin services interface complements the plugin API by exposing server functionality that plugins can call. For developer information about writing plugin services, see [MySQL Services for Plugins](https://dev.mysql.com/doc/extending-mysql/8.0/en/services-for-plugins.html). The following sections describe plugin services available at the SQL and C-language levels.

#### 5.6.9.1 The Locking Service

MySQL distributions provide a locking interface that is accessible at two levels:

* At the SQL level, as a set of loadable functions that each map onto calls to the service routines.
* As a C language interface, callable as a plugin service from server plugins or loadable functions.

For general information about plugin services, see [Section 5.6.9, “MySQL Plugin Services”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-services). For general information about loadable functions, see [Adding a Loadable Function](https://dev.mysql.com/doc/extending-mysql/8.0/en/adding-loadable-function.html).

The locking interface has these characteristics:

* Locks have three attributes: Lock namespace, lock name, and lock mode:
  + Locks are identified by the combination of namespace and lock name. The namespace enables different applications to use the same lock names without colliding by creating locks in separate namespaces. For example, if applications A and B use namespaces of **ns1** and **ns2**, respectively, each application can use lock names **lock1** and **lock2** without interfering with the other application.
  + A lock mode is either read or write. Read locks are shared: If a session has a read lock on a given lock identifier, other sessions can acquire a read lock on the same identifier. Write locks are exclusive: If a session has a write lock on a given lock identifier, other sessions cannot acquire a read or write lock on the same identifier.
* Namespace and lock names must be non-**NULL**, nonempty, and have a maximum length of 64 characters. A namespace or lock name specified as **NULL**, the empty string, or a string longer than 64 characters results in an [**ER\_LOCKING\_SERVICE\_WRONG\_NAME**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_locking_service_wrong_name) error.
* The locking interface treats namespace and lock names as binary strings, so comparisons are case-sensitive.
* The locking interface provides functions to acquire locks and release locks. No special privilege is required to call these functions. Privilege checking is the responsibility of the calling application.
* Locks can be waited for if not immediately available. Lock acquisition calls take an integer timeout value that indicates how many seconds to wait to acquire locks before giving up. If the timeout is reached without successful lock acquisition, an [**ER\_LOCKING\_SERVICE\_TIMEOUT**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_locking_service_timeout) error occurs. If the timeout is 0, there is no waiting and the call produces an error if locks cannot be acquired immediately.
* The locking interface detects deadlock between lock-acquisition calls in different sessions. In this case, the locking service chooses a caller and terminates its lock-acquisition request with an [**ER\_LOCKING\_SERVICE\_DEADLOCK**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_locking_service_deadlock) error. This error does not cause transactions to roll back. To choose a session in case of deadlock, the locking service prefers sessions that hold read locks over sessions that hold write locks.
* A session can acquire multiple locks with a single lock-acquisition call. For a given call, lock acquisition is atomic: The call succeeeds if all locks are acquired. If acquisition of any lock fails, the call acquires no locks and fails, typically with an [**ER\_LOCKING\_SERVICE\_TIMEOUT**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_locking_service_timeout) or [**ER\_LOCKING\_SERVICE\_DEADLOCK**](https://dev.mysql.com/doc/mysql-errors/8.0/en/server-error-reference.html#error_er_locking_service_deadlock) error.
* A session can acquire multiple locks for the same lock identifier (namespace and lock name combination). These lock instances can be read locks, write locks, or a mix of both.
* Locks acquired within a session are released explicitly by calling a release-locks function, or implicitly when the session terminates (either normally or abnormally). Locks are not released when transactions commit or roll back.
* Within a session, all locks for a given namespace when released are released together.

The interface provided by the locking service is distinct from that provided by [**GET\_LOCK()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_get-lock) and related SQL functions (see [Section 12.15, “Locking Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#locking-functions)). For example, [**GET\_LOCK()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_get-lock) does not implement namespaces and provides only exclusive locks, not distinct read and write locks.

##### 5.6.9.1.1 The Locking Service C Interface

This section describes how to use the locking service C language interface. To use the function interface instead, see [Section 5.6.9.1.2, “The Locking Service Function Interface”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-interface) For general characteristics of the locking service interface, see [Section 5.6.9.1, “The Locking Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service). For general information about plugin services, see [Section 5.6.9, “MySQL Plugin Services”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#plugin-services).

Source files that use the locking service should include this header file:

#include <mysql/service\_locking.h>

To acquire one or more locks, call this function:

int mysql\_acquire\_locking\_service\_locks(MYSQL\_THD opaque\_thd,

const char\* lock\_namespace,

const char\*\*lock\_names,

size\_t lock\_num,

enum enum\_locking\_service\_lock\_type lock\_type,

unsigned long lock\_timeout);

The arguments have these meanings:

* **opaque\_thd**: A thread handle. If specified as **NULL**, the handle for the current thread is used.
* **lock\_namespace**: A null-terminated string that indicates the lock namespace.
* **lock\_names**: An array of null-terminated strings that provides the names of the locks to acquire.
* **lock\_num**: The number of names in the **lock\_names** array.
* **lock\_type**: The lock mode, either **LOCKING\_SERVICE\_READ** or **LOCKING\_SERVICE\_WRITE** to acquire read locks or write locks, respectively.
* **lock\_timeout**: An integer number of seconds to wait to acquire the locks before giving up.

To release locks acquired for a given namespace, call this function:

int mysql\_release\_locking\_service\_locks(MYSQL\_THD opaque\_thd,

const char\* lock\_namespace);

The arguments have these meanings:

* **opaque\_thd**: A thread handle. If specified as **NULL**, the handle for the current thread is used.
* **lock\_namespace**: A null-terminated string that indicates the lock namespace.

Locks acquired or waited for by the locking service can be monitored at the SQL level using the Performance Schema. For details, see [Locking Service Monitoring](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-monitoring).

##### 5.6.9.1.2 The Locking Service Function Interface

This section describes how to use the locking service interface provided by its loadable functions. To use the C language interface instead, see [Section 5.6.9.1.1, “The Locking Service C Interface”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-c-interface) For general characteristics of the locking service interface, see [Section 5.6.9.1, “The Locking Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service). For general information about loadable functions, see [Adding a Loadable Function](https://dev.mysql.com/doc/extending-mysql/8.0/en/adding-loadable-function.html).

* [Installing or Uninstalling the Locking Service Function Interface](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-function-installation)
* [Using the Locking Service Function Interface](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-function-usage)
* [Locking Service Monitoring](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-monitoring)
* [Locking Service Interface Function Reference](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-function-reference)

###### Installing or Uninstalling the Locking Service Function Interface

The locking service routines described in [Section 5.6.9.1.1, “The Locking Service C Interface”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-c-interface) need not be installed because they are built into the server. The same is not true of the loadable functions that map onto calls to the service routines: The functions must be installed before use. This section describes how to do that. For general information about loadable function installation, see [Section 5.7.1, “Installing and Uninstalling Loadable Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function-loading).

The locking service functions are implemented in a plugin library file located in the directory named by the [**plugin\_dir**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_plugin_dir) system variable. The file base name is **locking\_service**. The file name suffix differs per platform (for example, .so for Unix and Unix-like systems, .dll for Windows).

To install the locking service functions, use the [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function) statement, adjusting the .so suffix for your platform as necessary:

CREATE FUNCTION service\_get\_read\_locks RETURNS INT

SONAME 'locking\_service.so';

CREATE FUNCTION service\_get\_write\_locks RETURNS INT

SONAME 'locking\_service.so';

CREATE FUNCTION service\_release\_locks RETURNS INT

SONAME 'locking\_service.so';

If the functions are used on a replication source server, install them on all replica servers as well to avoid replication problems.

Once installed, the functions remain installed until uninstalled. To remove them, use the [**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function) statement:

DROP FUNCTION service\_get\_read\_locks;

DROP FUNCTION service\_get\_write\_locks;

DROP FUNCTION service\_release\_locks;

###### Using the Locking Service Function Interface

Before using the locking service functions, install them according to the instructions provided at [Installing or Uninstalling the Locking Service Function Interface](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-function-installation).

To acquire one or more read locks, call this function:

mysql> **SELECT service\_get\_read\_locks('mynamespace', 'rlock1', 'rlock2', 10);**

+---------------------------------------------------------------+

| service\_get\_read\_locks('mynamespace', 'rlock1', 'rlock2', 10) |

+---------------------------------------------------------------+

| 1 |

+---------------------------------------------------------------+

The first argument is the lock namespace. The final argument is an integer timeout indicating how many seconds to wait to acquire the locks before giving up. The arguments in between are the lock names.

For the example just shown, the function acquires locks with lock identifiers **(mynamespace, rlock1)** and **(mynamespace, rlock2)**.

To acquire write locks rather than read locks, call this function:

mysql> **SELECT service\_get\_write\_locks('mynamespace', 'wlock1', 'wlock2', 10);**

+----------------------------------------------------------------+

| service\_get\_write\_locks('mynamespace', 'wlock1', 'wlock2', 10) |

+----------------------------------------------------------------+

| 1 |

+----------------------------------------------------------------+

In this case, the lock identifiers are **(mynamespace, wlock1)** and **(mynamespace, wlock2)**.

To release all locks for a namespace, use this function:

mysql> **SELECT service\_release\_locks('mynamespace');**

+--------------------------------------+

| service\_release\_locks('mynamespace') |

+--------------------------------------+

| 1 |

+--------------------------------------+

Each locking function returns nonzero for success. If the function fails, an error occurs. For example, the following error occurs because lock names cannot be empty:

mysql> **SELECT service\_get\_read\_locks('mynamespace', '', 10);**

ERROR 3131 (42000): Incorrect locking service lock name ''.

A session can acquire multiple locks for the same lock identifier. As long as a different session does not have a write lock for an identifier, the session can acquire any number of read or write locks. Each lock request for the identifier acquires a new lock. The following statements acquire three write locks with the same identifier, then three read locks for the same identifier:

SELECT service\_get\_write\_locks('ns', 'lock1', 'lock1', 'lock1', 0);

SELECT service\_get\_read\_locks('ns', 'lock1', 'lock1', 'lock1', 0);

If you examine the Performance Schema **metadata\_locks** table at this point, you should find that the session holds six distinct locks with the same **(ns, lock1)** identifier. (For details, see [Locking Service Monitoring](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-monitoring).)

Because the session holds at least one write lock on **(ns, lock1)**, no other session can acquire a lock for it, either read or write. If the session held only read locks for the identifier, other sessions could acquire read locks for it, but not write locks.

Locks for a single lock-acquisition call are acquired atomically, but atomicity does not hold across calls. Thus, for a statement such as the following, where [**service\_get\_write\_locks()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_service-get-write-locks) is called once per row of the result set, atomicity holds for each individual call, but not for the statement as a whole:

SELECT service\_get\_write\_locks('ns', 'lock1', 'lock2', 0) FROM t1 WHERE ... ;

**Caution**

Because the locking service returns a separate lock for each successful request for a given lock identifier, it is possible for a single statement to acquire a large number of locks. For example:

INSERT INTO ... SELECT service\_get\_write\_locks('ns', t1.col\_name, 0) FROM t1;

These types of statements may have certain adverse effects. For example, if the statement fails part way through and rolls back, locks acquired up to the point of failure still exist. If the intent is for there to be a correspondence between rows inserted and locks acquired, that intent is not satisfied. Also, if it is important that locks are granted in a certain order, be aware that result set order may differ depending on which execution plan the optimizer chooses. For these reasons, it may be best to limit applications to a single lock-acquisition call per statement.

###### Locking Service Monitoring

The locking service is implemented using the MySQL Server metadata locks framework, so you monitor locking service locks acquired or waited for by examining the Performance Schema **metadata\_locks** table.

First, enable the metadata lock instrument:

mysql> **UPDATE performance\_schema.setup\_instruments SET ENABLED = 'YES'**

-> **WHERE NAME = 'wait/lock/metadata/sql/mdl';**

Then acquire some locks and check the contents of the **metadata\_locks** table:

mysql> **SELECT service\_get\_write\_locks('mynamespace', 'lock1', 0);**

+----------------------------------------------------+

| service\_get\_write\_locks('mynamespace', 'lock1', 0) |

+----------------------------------------------------+

| 1 |

+----------------------------------------------------+

mysql> **SELECT service\_get\_read\_locks('mynamespace', 'lock2', 0);**

+---------------------------------------------------+

| service\_get\_read\_locks('mynamespace', 'lock2', 0) |

+---------------------------------------------------+

| 1 |

+---------------------------------------------------+

mysql> **SELECT OBJECT\_TYPE, OBJECT\_SCHEMA, OBJECT\_NAME, LOCK\_TYPE, LOCK\_STATUS**

-> **FROM performance\_schema.metadata\_locks**

-> **WHERE OBJECT\_TYPE = 'LOCKING SERVICE'\G**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 1. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

OBJECT\_TYPE: LOCKING SERVICE

OBJECT\_SCHEMA: mynamespace

OBJECT\_NAME: lock1

LOCK\_TYPE: EXCLUSIVE

LOCK\_STATUS: GRANTED

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 2. row \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

OBJECT\_TYPE: LOCKING SERVICE

OBJECT\_SCHEMA: mynamespace

OBJECT\_NAME: lock2

LOCK\_TYPE: SHARED

LOCK\_STATUS: GRANTED

Locking service locks have an **OBJECT\_TYPE** value of **LOCKING SERVICE**. This is distinct from, for example, locks acquired with the [**GET\_LOCK()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_get-lock) function, which have an **OBJECT\_TYPE** of **USER LEVEL LOCK**.

The lock namespace, name, and mode appear in the **OBJECT\_SCHEMA**, **OBJECT\_NAME**, and **LOCK\_TYPE** columns. Read and write locks have **LOCK\_TYPE** values of **SHARED** and **EXCLUSIVE**, respectively.

The **LOCK\_STATUS** value is **GRANTED** for an acquired lock, **PENDING** for a lock that is being waited for. You can expect to see **PENDING** if one session holds a write lock and another session is attempting to acquire a lock having the same identifier.

###### Locking Service Interface Function Reference

The SQL interface to the locking service implements the loadable functions described in this section. For usage examples, see [Using the Locking Service Function Interface](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#locking-service-function-usage).

The functions share these characteristics:

* The return value is nonzero for success. Otherwise, an error occurs.
* Namespace and lock names must be non-**NULL**, nonempty, and have a maximum length of 64 characters.
* Timeout values must be integers indicating how many seconds to wait to acquire locks before giving up with an error. If the timeout is 0, there is no waiting and the function produces an error if locks cannot be acquired immediately.

These locking service functions are available:

* **[service\_get\_read\_locks(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[namespace](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[lock\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[lock\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[] ...,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-read-locks)**

Acquires one or more read (shared) locks in the given namespace using the given lock names, timing out with an error if the locks are not acquired within the given timeout value.

* **[service\_get\_write\_locks(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[namespace](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[lock\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[[,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[lock\_name](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[] ...,](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[timeout](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-get-write-locks)**

Acquires one or more write (exclusive) locks in the given namespace using the given lock names, timing out with an error if the locks are not acquired within the given timeout value.

* **[service\_release\_locks(](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-release-locks)*[namespace](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-release-locks)*[)](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "function_service-release-locks)**

For the given namespace, releases all locks that were acquired within the current session using [**service\_get\_read\_locks()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_service-get-read-locks) and [**service\_get\_write\_locks()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#function_service-get-write-locks).

It is not an error for there to be no locks in the namespace.

#### 5.6.9.2 The Keyring Service

MySQL Server supports a keyring service that enables internal components and plugins to securely store sensitive information for later retrieval. MySQL distributions provide a keyring interface that is accessible at two levels:

* At the SQL level, as a set of loadable functions that each map onto calls to the service routines.
* As a C language interface, callable as a plugin service from server plugins or loadable functions.

This section describes how to use the keyring service functions to store, retrieve, and remove keys in the MySQL keyring keystore. For information about the SQL interface that uses functions, [Section 6.4.4.14, “General-Purpose Keyring Key-Management Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#keyring-functions-general-purpose). For general keyring information, see [Section 6.4.4, “The MySQL Keyring”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#keyring).

The keyring service uses whatever underlying keyring plugin is enabled, if any. If no keyring plugin is enabled, keyring service calls fail.

A “record” in the keystore consists of data (the key itself) and a unique identifier through which the key is accessed. The identifier has two parts:

* **key\_id**: The key ID or name. **key\_id** values that begin with **mysql\_** are reserved by MySQL Server.
* **user\_id**: The session effective user ID. If there is no user context, this value can be **NULL**. The value need not actually be a “user”; the meaning depends on the application.

Functions that implement the keyring function interface pass the value of [**CURRENT\_USER()**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\functions.html#function_current-user) as the **user\_id** value to keyring service functions.

The keyring service functions have these characteristics in common:

* Each function returns 0 for success, 1 for failure.
* The **key\_id** and **user\_id** arguments form a unique combination indicating which key in the keyring to use.
* The **key\_type** argument provides additional information about the key, such as its encryption method or intended use.
* Keyring service functions treat key IDs, user names, types, and values as binary strings, so comparisons are case-sensitive. For example, IDs of **MyKey** and **mykey** refer to different keys.

These keyring service functions are available:

* **my\_key\_fetch()**

Deobfuscates and retrieves a key from the keyring, along with its type. The function allocates the memory for the buffers used to store the returned key and key type. The caller should zero or obfuscate the memory when it is no longer needed, then free it.

Syntax:

bool my\_key\_fetch(const char \*key\_id, const char \*\*key\_type,

const char\* user\_id, void \*\*key, size\_t \*key\_len)

Arguments:

* + **key\_id**, **user\_id**: Null-terminated strings that as a pair form a unique identifier indicating which key to fetch.
  + **key\_type**: The address of a buffer pointer. The function stores into it a pointer to a null-terminated string that provides additional information about the key (stored when the key was added).
  + **key**: The address of a buffer pointer. The function stores into it a pointer to the buffer containing the fetched key data.
  + **key\_len**: The address of a variable into which the function stores the size in bytes of the **\*key** buffer.

Return value:

Returns 0 for success, 1 for failure.

* **my\_key\_generate()**

Generates a new random key of a given type and length and stores it in the keyring. The key has a length of **key\_len** and is associated with the identifier formed from **key\_id** and **user\_id**. The type and length values must be consistent with the values supported by the underlying keyring plugin. See [Section 6.4.4.12, “Supported Keyring Key Types and Lengths”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#keyring-key-types).

Syntax:

bool my\_key\_generate(const char \*key\_id, const char \*key\_type,

const char \*user\_id, size\_t key\_len)

Arguments:

* + **key\_id**, **user\_id**: Null-terminated strings that as a pair form a unique identifier for the key to be generated.
  + **key\_type**: A null-terminated string that provides additional information about the key.
  + **key\_len**: The size in bytes of the key to be generated.

Return value:

Returns 0 for success, 1 for failure.

* **my\_key\_remove()**

Removes a key from the keyring.

Syntax:

bool my\_key\_remove(const char \*key\_id, const char\* user\_id)

Arguments:

* + **key\_id**, **user\_id**: Null-terminated strings that as a pair form a unique identifier for the key to be removed.

Return value:

Returns 0 for success, 1 for failure.

* **my\_key\_store()**

Obfuscates and stores a key in the keyring.

Syntax:

bool my\_key\_store(const char \*key\_id, const char \*key\_type,

const char\* user\_id, void \*key, size\_t key\_len)

Arguments:

* + **key\_id**, **user\_id**: Null-terminated strings that as a pair form a unique identifier for the key to be stored.
  + **key\_type**: A null-terminated string that provides additional information about the key.
  + **key**: The buffer containing the key data to be stored.
  + **key\_len**: The size in bytes of the **key** buffer.

Return value:

Returns 0 for success, 1 for failure.

## 5.7 MySQL服务器可加载函数

5.7.1 安装和卸载可加载函数

5.7.2 获取关于可加载函数的信息

MySQL支持可加载函数，即不是内建的函数，但可以在运行时加载（在启动时或之后）以扩展服务器能力，或卸载以移除能力。关于描述可用的可加载函数的表格，见第12.2节，"可加载函数参考"。可加载函数与内置（本地）函数形成对比，后者是作为服务器的一部分实现的，并且总是可用的；关于表格，请参见第12.1节，"内置函数和操作符参考"。

注意

可加载函数以前被称为用户定义的函数（UDFs）。这个术语有些名不副实，因为 "用户定义 "也可以适用于其他类型的函数，如存储函数（一种使用SQL编写的存储对象）和通过修改服务器源代码添加的本地函数。

MySQL发行版包括全部或部分实现这些服务器功能的可加载函数。

- 组复制使你能够在一组MySQL服务器实例中创建一个高可用的分布式MySQL服务，其数据一致性、冲突检测和解决以及组成员服务都是内置的。参见第18章，组复制。

- MySQL企业版包括基于OpenSSL库执行加密操作的功能。参见第6.6节，"MySQL企业版加密"。

- MySQL企业版包括为屏蔽和去标识操作提供SQL级API的函数。参见第6.5.1节，"MySQL企业版数据屏蔽和去识别元素"。

- MySQL企业版包括用于监测和记录连接和查询活动的审计日志。参见第6.4.5节 "MySQL企业审计 "和第6.4.6节 "审计消息组件"。

- MySQL企业版包括一个防火墙功能，它实现了一个应用级防火墙，使数据库管理员能够根据与所接受的语句模式的匹配来允许或拒绝SQL语句的执行。见第6.4.7节，"MySQL企业版防火墙"。

- 查询改写器检查MySQL服务器收到的语句，并可能在服务器执行这些语句之前对其进行改写。参见第5.6.4节，"重写器查询重写插件"

- 版本令牌能够创建和同步服务器令牌，应用程序可以使用这些令牌来防止访问不正确或过时的数据。参见第5.6.6节，"版本令牌"。

- MySQL密钥环为敏感信息提供安全存储。参见第6.4.4节，"MySQL钥匙圈"。

- 锁定服务提供了一个锁定接口供应用程序使用。参见第5.6.9.1节，"锁定服务"。

- 一个函数提供对查询属性的访问。参见第9.6节，"查询属性"。

下面几节描述了如何安装和卸载可加载函数，以及如何在运行时确定哪些可加载函数被安装并获得有关它们的信息。

在某些情况下，可加载函数是通过安装实现该函数的组件来加载的，而不是通过直接加载该函数。关于某个特定的可加载函数的细节，请参见包含该函数的服务器功能的安装说明。

有关编写可加载函数的信息，请参阅向MySQL添加函数。

### 5.7.1 安装和卸载可加载函数

顾名思义，可加载函数在使用前必须被加载到服务器中。MySQL支持在服务器启动时自动加载函数，之后再手动加载。

当一个可加载的函数被加载时，关于它的信息可在第5.7.2节 "获取可加载函数的信息 "中描述。

- 安装可加载的功能

- 卸载可加载的功能

- 重新安装或升级可加载的功能

安装可加载的功能

To load a loadable function manually, use the [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable) statement. For example:

CREATE FUNCTION metaphon

RETURNS STRING

SONAME 'udf\_example.so';

The file base name depends on your platform. Common suffixes are .so for Unix and Unix-like systems, .dll for Windows.

[**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable) has these effects:

* It loads the function into the server to make it available immediately.
* It registers the function in the **mysql.func** system table to make it persistent across server restarts. For this reason, [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable) requires the [**INSERT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_insert) privilege for the **mysql** system database.
* It adds the function to the Performance Schema [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table that provides runtime information about installed loadable functions. See [Section 5.7.2, “Obtaining Information About Loadable Functions”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#obtaining-loadable-function-information).

Automatic loading of loadable functions occurs during the normal server startup sequence:

* Functions registered in the **mysql.func** table are installed.
* Components or plugins that are installed at startup may automatically install related functions.
* Automatic function installation adds the functions to the Performance Schema [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table that provides runtime information about installed functions.

If the server is started with the [--skip-grant-tables](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-grant-tables) option, functions registered in the **mysql.func** table are not loaded and are unavailable. This does not apply to functions installed automatically by a component or plugin.

#### Uninstalling Loadable Functions

To remove a loadable function, use the [**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function-loadable) statement. For example:

DROP FUNCTION metaphon;

[**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function-loadable) has these effects:

* It unloads the function to make it unavailable.
* It removes the function from the **mysql.func** system table. For this reason, [**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function-loadable) requires the [**DELETE**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\security.html#priv_delete) privilege for the **mysql** system database. With the function no longer registered in the **mysql.func** table, the server does not load the function during subsequent restarts.
* It removes the function from the Performance Schema [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table that provides runtime information about installed loadable functions.

[**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function-loadable) cannot be used to drop a loadable function that is installed automatically by components or plugins rather than by using [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable). Such a function is also dropped automatically, when the component or plugin that installed it is uninstalled.

#### Reinstalling or Upgrading Loadable Functions

To reinstall or upgrade the shared library associated with a loadable function, issue a [**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function-loadable) statement, upgrade the shared library, and then issue a [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable) statement. If you upgrade the shared library first and then use [**DROP FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#drop-function-loadable), the server may unexpectedly shut down.

### 5.7.2 Obtaining Information About Loadable Functions

The Performance Schema [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table contains information about the currently installed loadable functions:

SELECT \* FROM performance\_schema.user\_defined\_functions;

The **mysql.func** system table also lists installed loadable functions, but only those installed using [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable). The [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) table lists loadable functions installed using [**CREATE FUNCTION**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#create-function-loadable) as well as loadable functions installed automatically by components or plugins. This difference makes [**user\_defined\_functions**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table) preferable to **mysql.func** for checking which loadable functions are installed. See [Section 27.12.21.8, “The user\_defined\_functions Table”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\performance-schema.html#performance-schema-user-defined-functions-table).

## 5.8 在一台机器上运行多个MySQL实例

5.8.1 设置多个数据目录

5.8.2 在Windows上运行多个MySQL实例

5.8.3 在Unix上运行多个MySQL实例

5.8.4 在多服务器环境中使用客户端程序

在某些情况下，你可能想在一台机器上运行多个MySQL实例。你可能想测试一个新的MySQL版本，同时让现有的生产设置不受干扰。或者你可能想让不同的用户访问他们自己管理的不同的mysqld服务器。(例如，你可能是一个互联网服务提供商，希望为不同的客户提供独立的MySQL安装。)

可以为每个实例使用不同的MySQL服务器二进制文件，或为多个实例使用相同的二进制文件，或这两种方法的任何组合。例如，你可以运行一个来自MySQL 5.7的服务器和一个来自MySQL 8.0的服务器，以查看不同版本如何处理给定的工作负载。或者你可以运行当前生产版本的多个实例，每个实例管理一组不同的数据库。

无论你是否使用不同的服务器二进制文件，你所运行的每个实例都必须为几个操作参数配置独特的值。这消除了实例之间发生冲突的可能性。参数可以在命令行、选项文件中或通过设置环境变量来设置。见第4.2.2节，"指定程序选项"。要查看一个给定实例使用的值，可以连接到它并执行SHOW VARIABLES语句。

由MySQL实例管理的主要资源是数据目录。每个实例应使用不同的数据目录，其位置用-datadir=dir\_name选项指定。关于用自己的数据目录配置每个实例的方法，以及关于不这样做的危险的警告，见5.8.1节 "设置多个数据目录"。

除了使用不同的数据目录外，其他几个选项对于每个服务器实例必须有不同的值。

--port=port\_num

--port控制TCP/IP连接的端口号。另外，如果主机有多个网络地址，你可以设置bind\_address系统变量，使每个服务器监听不同的地址。

--socket={file\_name|pipe\_name}。

--socket在Unix上控制Unix套接字文件路径，在Windows上控制命名管道名称。在Windows上，只有那些被配置为允许命名管道连接的服务器，才有必要指定不同的管道名称。

--shared-memory-base-name=name

这个选项只在Windows下使用。它指定了Windows服务器所使用的共享内存名称，以允许客户使用共享内存进行连接。只有那些被配置为允许共享内存连接的服务器才有必要指定不同的共享内存名称。

-pid-file=file\_name

这个选项表示服务器写入其进程ID的文件的路径名称。

如果你使用下列日志文件选项，它们的值在每台服务器上必须不同。

--general\_log\_file=file\_name

--log-bin[=file\_name] 。

--slow\_query\_log\_file=file\_name

--log-error[=file\_name]。

关于日志文件选项的进一步讨论，见第5.4节 "MySQL服务器日志"。

为了获得更好的性能，你可以为每台服务器不同地指定以下选项，以便在几个物理磁盘之间分散负载。

--tmpdir=dir\_name

拥有不同的临时目录也可以更容易地确定哪个MySQL服务器创建了任何特定的临时文件。

如果你在不同的地方有多个MySQL安装，你可以用-basedir=dir\_name选项为每个安装指定基础目录。这将导致每个实例自动使用不同的数据目录、日志文件和PID文件，因为这些参数的默认值是相对于基础目录的。在这种情况下，你唯一需要指定的其他选项是--socket和--port选项。假设你使用tar文件的二进制分发来安装不同版本的MySQL。这些安装在不同的位置，所以你可以使用bin/mysqld\_safe命令在其相应的基础目录下启动每个安装的服务器。mysqld\_safe决定了传递给mysqld的适当的-basedir选项，你只需要向mysqld\_safe指定-socket和-port选项。

正如下面几节所讨论的，可以通过指定适当的命令选项或设置环境变量来启动其他服务器。然而，如果你需要更长期地运行多个服务器，使用选项文件为每个服务器指定那些必须是它独有的选项值会更方便。--defaults-file选项对这个目的很有用。

### 5.8.1 Setting Up Multiple Data Directories

Each MySQL Instance on a machine should have its own data directory. The location is specified using the [--datadir=***dir\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) option.

There are different methods of setting up a data directory for a new instance:

* Create a new data directory.
* Copy an existing data directory.

The following discussion provides more detail about each method.

**Warning**

Normally, you should never have two servers that update data in the same databases. This may lead to unpleasant surprises if your operating system does not support fault-free system locking. If (despite this warning) you run multiple servers using the same data directory and they have logging enabled, you must use the appropriate options to specify log file names that are unique to each server. Otherwise, the servers try to log to the same files.

Even when the preceding precautions are observed, this kind of setup works only with **MyISAM** and **MERGE** tables, and not with any of the other storage engines. Also, this warning against sharing a data directory among servers always applies in an NFS environment. Permitting multiple MySQL servers to access a common data directory over NFS is a very bad idea. The primary problem is that NFS is the speed bottleneck. It is not meant for such use. Another risk with NFS is that you must devise a way to ensure that two or more servers do not interfere with each other. Usually NFS file locking is handled by the **lockd** daemon, but at the moment there is no platform that performs locking 100% reliably in every situation.

#### Create a New Data Directory

With this method, the data directory is in the same state as when you first install MySQL, and has the default set of MySQL accounts and no user data.

On Unix, initialize the data directory. See [Section 2.10, “Postinstallation Setup and Testing”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#postinstallation).

On Windows, the data directory is included in the MySQL distribution:

* MySQL Zip archive distributions for Windows contain an unmodified data directory. You can unpack such a distribution into a temporary location, then copy it data directory to where you are setting up the new instance.
* Windows MSI package installers create and set up the data directory that the installed server uses, but also create a pristine “template” data directory named data under the installation directory. After an installation has been performed using an MSI package, the template data directory can be copied to set up additional MySQL instances.

#### Copy an Existing Data Directory

With this method, any MySQL accounts or user data present in the data directory are carried over to the new data directory.

1. Stop the existing MySQL instance using the data directory. This must be a clean shutdown so that the instance flushes any pending changes to disk.
2. Copy the data directory to the location where the new data directory should be.
3. Copy the my.cnf or my.ini option file used by the existing instance. This serves as a basis for the new instance.
4. Modify the new option file so that any pathnames referring to the original data directory refer to the new data directory. Also, modify any other options that must be unique per instance, such as the TCP/IP port number and the log files. For a list of parameters that must be unique per instance, see [Section 5.8, “Running Multiple MySQL Instances on One Machine”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#multiple-servers).
5. Start the new instance, telling it to use the new option file.

### 5.8.2 Running Multiple MySQL Instances on Windows

[5.8.2.1 Starting Multiple MySQL Instances at the Windows Command Line](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#multiple-windows-command-line-servers)

[5.8.2.2 Starting Multiple MySQL Instances as Windows Services](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#multiple-windows-services)

You can run multiple servers on Windows by starting them manually from the command line, each with appropriate operating parameters, or by installing several servers as Windows services and running them that way. General instructions for running MySQL from the command line or as a service are given in [Section 2.3, “Installing MySQL on Microsoft Windows”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-installation). The following sections describe how to start each server with different values for those options that must be unique per server, such as the data directory. These options are listed in [Section 5.8, “Running Multiple MySQL Instances on One Machine”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#multiple-servers).

#### 5.8.2.1 Starting Multiple MySQL Instances at the Windows Command Line

The procedure for starting a single MySQL server manually from the command line is described in [Section 2.3.4.6, “Starting MySQL from the Windows Command Line”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-command-line). To start multiple servers this way, you can specify the appropriate options on the command line or in an option file. It is more convenient to place the options in an option file, but it is necessary to make sure that each server gets its own set of options. To do this, create an option file for each server and tell the server the file name with a [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) option when you run it.

Suppose that you want to run one instance of [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) on port 3307 with a data directory of C:\mydata1, and another instance on port 3308 with a data directory of C:\mydata2. Use this procedure:

1. Make sure that each data directory exists, including its own copy of the **mysql** database that contains the grant tables.
2. Create two option files. For example, create one file named C:\my-opts1.cnf that looks like this:
3. [mysqld]
4. datadir = C:/mydata1
5. port = 3307

Create a second file named C:\my-opts2.cnf that looks like this:

[mysqld]

datadir = C:/mydata2

port = 3308

1. Use the [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) option to start each server with its own option file:
2. C:\> **C:\mysql\bin\mysqld --defaults-file=C:\my-opts1.cnf**
3. C:\> **C:\mysql\bin\mysqld --defaults-file=C:\my-opts2.cnf**

Each server starts in the foreground (no new prompt appears until the server exits later), so you need to issue those two commands in separate console windows.

To shut down the servers, connect to each using the appropriate port number:

C:\> **C:\mysql\bin\mysqladmin --port=3307 --host=127.0.0.1 --user=root --password shutdown**

C:\> **C:\mysql\bin\mysqladmin --port=3308 --host=127.0.0.1 --user=root --password shutdown**

Servers configured as just described permit clients to connect over TCP/IP. If your version of Windows supports named pipes and you also want to permit named-pipe connections, specify options that enable the named pipe and specify its name. Each server that supports named-pipe connections must use a unique pipe name. For example, the C:\my-opts1.cnf file might be written like this:

[mysqld]

datadir = C:/mydata1

port = 3307

enable-named-pipe

socket = mypipe1

Modify C:\my-opts2.cnf similarly for use by the second server. Then start the servers as described previously.

A similar procedure applies for servers that you want to permit shared-memory connections. Enable such connections by starting the server with the [**shared\_memory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory) system variable enabled and specify a unique shared-memory name for each server by setting the [**shared\_memory\_base\_name**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_shared_memory_base_name) system variable.

#### 5.8.2.2 Starting Multiple MySQL Instances as Windows Services

On Windows, a MySQL server can run as a Windows service. The procedures for installing, controlling, and removing a single MySQL service are described in [Section 2.3.4.8, “Starting MySQL as a Windows Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-service).

To set up multiple MySQL services, you must make sure that each instance uses a different service name in addition to the other parameters that must be unique per instance.

For the following instructions, suppose that you want to run the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server from two different versions of MySQL that are installed at C:\mysql-5.7.9 and C:\mysql-8.0.25, respectively. (This might be the case if you are running 5.7.9 as your production server, but also want to conduct tests using 8.0.25.)

To install MySQL as a Windows service, use the --install or --install-manual option. For information about these options, see [Section 2.3.4.8, “Starting MySQL as a Windows Service”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#windows-start-service).

Based on the preceding information, you have several ways to set up multiple services. The following instructions describe some examples. Before trying any of them, shut down and remove any existing MySQL services.

* ***Approach 1:*** Specify the options for all services in one of the standard option files. To do this, use a different service name for each server. Suppose that you want to run the 5.7.9 [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) using the service name of **mysqld1** and the 8.0.25 [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) using the service name **mysqld2**. In this case, you can use the **[mysqld1]** group for 5.7.9 and the **[mysqld2]** group for 8.0.25. For example, you can set up C:\my.cnf like this:
* # options for mysqld1 service
* [mysqld1]
* basedir = C:/mysql-5.7.9
* port = 3307
* enable-named-pipe
* socket = mypipe1
* # options for mysqld2 service
* [mysqld2]
* basedir = C:/mysql-8.0.25
* port = 3308
* enable-named-pipe
* socket = mypipe2

Install the services as follows, using the full server path names to ensure that Windows registers the correct executable program for each service:

C:\> **C:\mysql-5.7.9\bin\mysqld --install mysqld1**

C:\> **C:\mysql-8.0.25\bin\mysqld --install mysqld2**

To start the services, use the services manager, or **NET START** or **SC START** with the appropriate service names:

C:\> **SC START mysqld1**

C:\> **SC START mysqld2**

To stop the services, use the services manager, or use **NET STOP** or **SC STOP** with the appropriate service names:

C:\> **SC STOP mysqld1**

C:\> **SC STOP mysqld2**

* ***Approach 2:*** Specify options for each server in separate files and use [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) when you install the services to tell each server what file to use. In this case, each file should list options using a **[mysqld]** group.

With this approach, to specify options for the 5.7.9 [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), create a file C:\my-opts1.cnf that looks like this:

[mysqld]

basedir = C:/mysql-5.7.9

port = 3307

enable-named-pipe

socket = mypipe1

For the 8.0.25 [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), create a file C:\my-opts2.cnf that looks like this:

[mysqld]

basedir = C:/mysql-8.0.25

port = 3308

enable-named-pipe

socket = mypipe2

Install the services as follows (enter each command on a single line):

C:\> **C:\mysql-5.7.9\bin\mysqld --install mysqld1**

**--defaults-file=C:\my-opts1.cnf**

C:\> **C:\mysql-8.0.25\bin\mysqld --install mysqld2**

**--defaults-file=C:\my-opts2.cnf**

When you install a MySQL server as a service and use a [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) option, the service name must precede the option.

After installing the services, start and stop them the same way as in the preceding example.

To remove multiple services, use **SC DELETE *mysqld\_service\_name*** for each one. Alternatively, use [**mysqld --remove**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) for each one, specifying a service name following the [--remove](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_remove) option. If the service name is the default (**MySQL**), you can omit it when using [**mysqld --remove**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).

### 5.8.3 Running Multiple MySQL Instances on Unix

**Note**

The discussion here uses [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) to launch multiple instances of MySQL. For MySQL installation using an RPM distribution, server startup and shutdown is managed by systemd on several Linux platforms. On these platforms, [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) is not installed because it is unnecessary. For information about using systemd to handle multiple MySQL instances, see [Section 2.5.9, “Managing MySQL Server with systemd”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#using-systemd).

One way is to run multiple MySQL instances on Unix is to compile different servers with different default TCP/IP ports and Unix socket files so that each one listens on different network interfaces. Compiling in different base directories for each installation also results automatically in a separate, compiled-in data directory, log file, and PID file location for each server.

Assume that an existing 5.7 server is configured for the default TCP/IP port number (3306) and Unix socket file (/tmp/mysql.sock). To configure a new 8.0.25 server to have different operating parameters, use a **CMake** command something like this:

shell> **cmake . -DMYSQL\_TCP\_PORT=*port\_number* \**

**-DMYSQL\_UNIX\_ADDR=*file\_name* \**

**-DCMAKE\_INSTALL\_PREFIX=/usr/local/mysql-8.0.25**

Here, ***port\_number*** and ***file\_name*** must be different from the default TCP/IP port number and Unix socket file path name, and the [CMAKE\_INSTALL\_PREFIX](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_cmake_install_prefix) value should specify an installation directory different from the one under which the existing MySQL installation is located.

If you have a MySQL server listening on a given port number, you can use the following command to find out what operating parameters it is using for several important configurable variables, including the base directory and Unix socket file name:

shell> **mysqladmin --host=*host\_name* --port=*port\_number* variables**

With the information displayed by that command, you can tell what option values not to use when configuring an additional server.

If you specify **localhost** as the host name, [**mysqladmin**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) defaults to using a Unix socket file rather than TCP/IP. To explicitly specify the transport protocol, use the [--protocol={TCP|SOCKET|PIPE|MEMORY}](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_protocol) option.

You need not compile a new MySQL server just to start with a different Unix socket file and TCP/IP port number. It is also possible to use the same server binary and start each invocation of it with different parameter values at runtime. One way to do so is by using command-line options:

shell> **mysqld\_safe --socket=*file\_name* --port=*port\_number***

To start a second server, provide different [--socket](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_socket) and [--port](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_port) option values, and pass a [--datadir=***dir\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_datadir) option to [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) so that the server uses a different data directory.

Alternatively, put the options for each server in a different option file, then start each server using a [--defaults-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_defaults-file) option that specifies the path to the appropriate option file. For example, if the option files for two server instances are named /usr/local/mysql/my.cnf and /usr/local/mysql/my.cnf2, start the servers like this: command:

shell> **mysqld\_safe --defaults-file=/usr/local/mysql/my.cnf**

shell> **mysqld\_safe --defaults-file=/usr/local/mysql/my.cnf2**

Another way to achieve a similar effect is to use environment variables to set the Unix socket file name and TCP/IP port number:

shell> **MYSQL\_UNIX\_PORT=/tmp/mysqld-new.sock**

shell> **MYSQL\_TCP\_PORT=3307**

shell> **export MYSQL\_UNIX\_PORT MYSQL\_TCP\_PORT**

shell> **bin/mysqld --initialize --user=mysql**

shell> **mysqld\_safe --datadir=/path/to/datadir &**

This is a quick way of starting a second server to use for testing. The nice thing about this method is that the environment variable settings apply to any client programs that you invoke from the same shell. Thus, connections for those clients are automatically directed to the second server.

[Section 4.9, “Environment Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#environment-variables), includes a list of other environment variables you can use to affect MySQL programs.

On Unix, the [**mysqld\_multi**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-multi) script provides another way to start multiple servers. See [Section 4.3.4, “mysqld\_multi — Manage Multiple MySQL Servers”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-multi).

### 5.8.4 Using Client Programs in a Multiple-Server Environment

To connect with a client program to a MySQL server that is listening to different network interfaces from those compiled into your client, you can use one of the following methods:

* Start the client with [--host=***host\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) [--port=***port\_number***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_port) to connect using TCP/IP to a remote server, with [--host=127.0.0.1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) [--port=***port\_number***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_port) to connect using TCP/IP to a local server, or with [--host=localhost](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) [--socket=***file\_name***](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_socket) to connect to a local server using a Unix socket file or a Windows named pipe.
* Start the client with [--protocol=TCP](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_protocol) to connect using TCP/IP, [--protocol=SOCKET](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_protocol) to connect using a Unix socket file, [--protocol=PIPE](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_protocol) to connect using a named pipe, or [--protocol=MEMORY](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_protocol) to connect using shared memory. For TCP/IP connections, you may also need to specify [--host](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_host) and [--port](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_port) options. For the other types of connections, you may need to specify a [--socket](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_socket) option to specify a Unix socket file or Windows named-pipe name, or a [--shared-memory-base-name](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option_general_shared-memory-base-name) option to specify the shared-memory name. Shared-memory connections are supported only on Windows.
* On Unix, set the **MYSQL\_UNIX\_PORT** and **MYSQL\_TCP\_PORT** environment variables to point to the Unix socket file and TCP/IP port number before you start your clients. If you normally use a specific socket file or port number, you can place commands to set these environment variables in your .login file so that they apply each time you log in. See [Section 4.9, “Environment Variables”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#environment-variables).
* Specify the default Unix socket file and TCP/IP port number in the **[client]** group of an option file. For example, you can use C:\my.cnf on Windows, or the .my.cnf file in your home directory on Unix. See [Section 4.2.2.2, “Using Option Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#option-files).
* In a C program, you can specify the socket file or port number arguments in the [**mysql\_real\_connect()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-real-connect.html) call. You can also have the program read option files by calling [**mysql\_options()**](https://dev.mysql.com/doc/c-api/8.0/en/mysql-options.html). See [C API Basic Function Descriptions](https://dev.mysql.com/doc/c-api/8.0/en/c-api-function-descriptions.html).
* If you are using the Perl **DBD::mysql** module, you can read options from MySQL option files. For example:
* $dsn = "DBI:mysql:test;mysql\_read\_default\_group=client;"
* . "mysql\_read\_default\_file=/usr/local/mysql/data/my.cnf";
* $dbh = DBI->connect($dsn, $user, $password);

See [Section 29.9, “MySQL Perl API”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\connectors-apis.html#apis-perl).

Other programming interfaces may provide similar capabilities for reading option files.

## 5.9 调试MySQL

5.9.1 调试MySQL服务器

5.9.2 调试一个MySQL客户端

5.9.3 LOCK\_ORDER工具

5.9.4 DBUG包

本节介绍了有助于追踪MySQL中问题的调试技术。

### 5.9.1 调试MySQL服务器

5.9.1.1 编译用于调试的MySQL

5.9.1.2 创建跟踪文件

5.9.1.3 使用WER和PDB来创建Windows crashdump

5.9.1.4 在gdb下调试mysqld

5.9.1.5 使用堆栈跟踪

5.9.1.6 使用服务器日志查找mysqld中错误的原因

5.9.1.7 如果你遇到表损坏，制作一个测试案例

如果你正在使用一些在MySQL中非常新的功能，你可以尝试用--skip-new选项运行mysqld（它禁用所有新的、可能不安全的功能）。见B.3.3.3节，"如果MySQL一直崩溃该怎么办"。

如果mysqld不想启动，确认你没有干扰你设置的my.cnf文件！你可以检查你的my.cnf文件。你可以用mysqld --print-defaults检查你的my.cnf参数，并通过用mysqld --no-defaults启动避免使用它们 ....

如果mysqld开始占用CPU或内存，或者它 "挂起"，你可以使用mysqladmin processlist status来发现是否有人正在执行一个需要很长时间的查询。如果遇到性能问题或新客户无法连接的问题，在某个窗口运行mysqladmin -i10 processlist status可能是个好主意。

mysqladmin debug命令将一些关于正在使用的锁、使用的内存和查询使用的信息转储到MySQL日志文件中。这可能有助于解决一些问题。即使你没有为调试而编译MySQL，该命令也提供了一些有用的信息!

如果问题是某些表变得越来越慢，你应该尝试用OPTIMIZE TABLE或myisamchk来优化该表。见第5章，MySQL服务器管理。你还应该用EXPLAIN检查缓慢的查询。

你还应该阅读本手册中针对操作系统的部分，以了解可能是你的环境所特有的问题。见第2.1节，"一般安装指导"。

#### 5.9.1.1 编译用于调试的MySQL

If you have some very specific problem, you can always try to debug MySQL. To do this you must configure MySQL with the [-DWITH\_DEBUG=1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_debug) option. You can check whether MySQL was compiled with debugging by doing: [**mysqld --help**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld). If the [--debug](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_debug) flag is listed with the options then you have debugging enabled. [**mysqladmin ver**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin) also lists the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) version as [**mysql ... --debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) in this case.

If [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) stops crashing when you configure it with the [-DWITH\_DEBUG=1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_debug) CMake option, you probably have found a compiler bug or a timing bug within MySQL. In this case, you can try to add -g using the [CMAKE\_C\_FLAGS](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_cmake_c_flags) and [CMAKE\_CXX\_FLAGS](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_cmake_cxx_flags) CMake options and not use [-DWITH\_DEBUG=1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_debug). If [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) dies, you can at least attach to it with **gdb** or use **gdb** on the core file to find out what happened.

When you configure MySQL for debugging you automatically enable a lot of extra safety check functions that monitor the health of [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld). If they find something “unexpected,” an entry is written to **stderr**, which [**mysqld\_safe**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld-safe) directs to the error log! This also means that if you are having some unexpected problems with MySQL and are using a source distribution, the first thing you should do is to configure MySQL for debugging. If you believe that you have found a bug, please use the instructions at [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports).

In the Windows MySQL distribution, **mysqld.exe** is by default compiled with support for trace files.

#### 5.9.1.2 Creating Trace Files

If the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server does not start or it crashes easily, you can try to create a trace file to find the problem.

To do this, you must have a [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) that has been compiled with debugging support. You can check this by executing **mysqld -V**. If the version number ends with **-debug**, it is compiled with support for trace files. (On Windows, the debugging server is named [**mysqld-debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) rather than [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).)

Start the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server with a trace log in /tmp/mysqld.trace on Unix or \mysqld.trace on Windows:

shell> **mysqld --debug**

On Windows, you should also use the [--standalone](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_standalone) flag to not start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) as a service. In a console window, use this command:

C:\> **mysqld-debug --debug --standalone**

After this, you can use the **mysql.exe** command-line tool in a second console window to reproduce the problem. You can stop the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server with [**mysqladmin shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin).

The trace file can become ***very large***! To generate a smaller trace file, you can use debugging options something like this:

[**mysqld --debug=d,info,error,query,general,where:O,/tmp/mysqld.trace**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld)

This only prints information with the most interesting tags to the trace file.

If you file a bug, please add only those lines from the trace file to the bug report that indicate where something seems to go wrong. If you cannot locate the wrong place, open a bug report and upload the whole trace file to the report, so that a MySQL developer can take a look at it. For instructions, see [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports).

The trace file is made with the ***DBUG*** package by Fred Fish. See [Section 5.9.4, “The DBUG Package”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#dbug-package).

#### 5.9.1.3 Using WER with PDB to create a Windows crashdump

Program Database files (with suffix pdb) are included in the ***ZIP Archive Debug Binaries & Test Suite*** distribution of MySQL. These files provide information for debugging your MySQL installation in the event of a problem. This is a separate download from the standard MSI or Zip file.

**Note**

The PDB files are available in a separate file labeled "ZIP Archive Debug Binaries & Test Suite".

The PDB file contains more detailed information about **mysqld** and other tools that enables more detailed trace and dump files to be created. You can use these with **WinDbg** or Visual Studio to debug [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).

For more information on PDB files, see [Microsoft Knowledge Base Article 121366](http://support.microsoft.com/kb/121366/). For more information on the debugging options available, see [Debugging Tools for Windows](http://www.microsoft.com/whdc/devtools/debugging/default.mspx).

To use WinDbg, either install the full Windows Driver Kit (WDK) or install the standalone version.

**Important**

The .exe and .pdb files must be an exact match (both version number and MySQL server edition); otherwise, or WinDBG complains while attempting to load the symbols.

1. To generate a minidump mysqld.dmp, enable the [core-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_core-file) option under the [mysqld] section in my.ini. Restart the MySQL server after making these changes.
2. Create a directory to store the generated files, such as c:\symbols
3. Determine the path to your **windbg.exe** executable using the Find GUI or from the command line, for example: **dir /s /b windbg.exe** -- a common default is C:\Program Files\Debugging Tools for Windows (x64)\windbg.exe
4. Launch windbg.exe giving it the paths to mysqld.exe, mysqld.pdb, mysqld.dmp, and the source code. Alternatively, pass in each path from the WinDbg GUI. For example:
5. windbg.exe -i "C:\mysql-8.0.25-winx64\bin\"^
6. -z "C:\mysql-8.0.25-winx64\data\mysqld.dmp"^
7. -srcpath "E:\ade\mysql\_archives\8.0\8.0.25\mysql-8.0.25"^
8. -y "C:\mysql-8.0.25-winx64\bin;SRV\*c:\symbols\*http://msdl.microsoft.com/download/symbols"^
9. -v -n -c "!analyze -vvvvv"

**Note**

The **^** character and newline are removed by the Windows command line processor, so be sure the spaces remain intact.

#### 5.9.1.4 Debugging mysqld under gdb

On most systems you can also start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) from **gdb** to get more information if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) crashes.

With some older **gdb** versions on Linux you must use **run --one-thread** if you want to be able to debug [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) threads. In this case, you can only have one thread active at a time.

NPTL threads (the new thread library on Linux) may cause problems while running [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) under **gdb**. Some symptoms are:

* [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) hangs during startup (before it writes **ready for connections**).
* [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) crashes during a **pthread\_mutex\_lock()** or **pthread\_mutex\_unlock()** call.

In this case, you should set the following environment variable in the shell before starting **gdb**:

LD\_ASSUME\_KERNEL=2.4.1

export LD\_ASSUME\_KERNEL

When running [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) under **gdb**, you should disable the stack trace with [--skip-stack-trace](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_skip-stack-trace) to be able to catch segfaults within **gdb**.

Use the [--gdb](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_gdb) option to [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to install an interrupt handler for **SIGINT** (needed to stop [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with **^C** to set breakpoints) and disable stack tracing and core file handling.

It is very hard to debug MySQL under **gdb** if you do a lot of new connections the whole time as **gdb** does not free the memory for old threads. You can avoid this problem by starting [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with [**thread\_cache\_size**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) set to a value equal to [**max\_connections**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_max_connections) + 1. In most cases just using [--thread\_cache\_size=5'](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_thread_cache_size) helps a lot!

If you want to get a core dump on Linux if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) dies with a SIGSEGV signal, you can start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the [--core-file](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#option_mysqld_core-file) option. This core file can be used to make a backtrace that may help you find out why [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) died:

shell> **gdb mysqld core**

gdb> backtrace full

gdb> quit

See [Section B.3.3.3, “What to Do If MySQL Keeps Crashing”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\error-handling.html#crashing).

If you are using **gdb** on Linux, you should install a .gdb file, with the following information, in your current directory:

set print sevenbit off

handle SIGUSR1 nostop noprint

handle SIGUSR2 nostop noprint

handle SIGWAITING nostop noprint

handle SIGLWP nostop noprint

handle SIGPIPE nostop

handle SIGALRM nostop

handle SIGHUP nostop

handle SIGTERM nostop noprint

Here is an example how to debug [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld):

shell> **gdb /usr/local/libexec/mysqld**

gdb> run

...

backtrace full # Do this when mysqld crashes

Include the preceding output in a bug report, which you can file using the instructions in [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports).

If [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) hangs, you can try to use some system tools like **strace** or **/usr/proc/bin/pstack** to examine where [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) has hung.

strace /tmp/log libexec/mysqld

If you are using the Perl **DBI** interface, you can turn on debugging information by using the **trace** method or by setting the **DBI\_TRACE** environment variable.

#### 5.9.1.5 Using a Stack Trace

On some operating systems, the error log contains a stack trace if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) dies unexpectedly. You can use this to find out where (and maybe why) [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) died. See [Section 5.4.2, “The Error Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#error-log). To get a stack trace, you must not compile [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the -fomit-frame-pointer option to gcc. See [Section 5.9.1.1, “Compiling MySQL for Debugging”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#compiling-for-debugging).

A stack trace in the error log looks something like this:

mysqld got signal 11;

Attempting backtrace. You can use the following information

to find out where mysqld died. If you see no messages after

this, something went terribly wrong...

stack\_bottom = 0x41fd0110 thread\_stack 0x40000

mysqld(my\_print\_stacktrace+0x32)[0x9da402]

mysqld(handle\_segfault+0x28a)[0x6648e9]

/lib/libpthread.so.0[0x7f1a5af000f0]

/lib/libc.so.6(strcmp+0x2)[0x7f1a5a10f0f2]

mysqld(\_Z21check\_change\_passwordP3THDPKcS2\_Pcj+0x7c)[0x7412cb]

mysqld(\_ZN16set\_var\_password5checkEP3THD+0xd0)[0x688354]

mysqld(\_Z17sql\_set\_variablesP3THDP4ListI12set\_var\_baseE+0x68)[0x688494]

mysqld(\_Z21mysql\_execute\_commandP3THD+0x41a0)[0x67a170]

mysqld(\_Z11mysql\_parseP3THDPKcjPS2\_+0x282)[0x67f0ad]

mysqld(\_Z16dispatch\_command19enum\_server\_commandP3THDPcj+0xbb7[0x67fdf8]

mysqld(\_Z10do\_commandP3THD+0x24d)[0x6811b6]

mysqld(handle\_one\_connection+0x11c)[0x66e05e]

If resolution of function names for the trace fails, the trace contains less information:

mysqld got signal 11;

Attempting backtrace. You can use the following information

to find out where mysqld died. If you see no messages after

this, something went terribly wrong...

stack\_bottom = 0x41fd0110 thread\_stack 0x40000

[0x9da402]

[0x6648e9]

[0x7f1a5af000f0]

[0x7f1a5a10f0f2]

[0x7412cb]

[0x688354]

[0x688494]

[0x67a170]

[0x67f0ad]

[0x67fdf8]

[0x6811b6]

[0x66e05e]

Newer versions of **glibc** stack trace functions also print the address as relative to the object. On **glibc**-based systems (Linux), the trace for an unexpected exit within a plugin looks something like:

plugin/auth/auth\_test\_plugin.so(+0x9a6)[0x7ff4d11c29a6]

To translate the relative address (**+0x9a6**) into a file name and line number, use this command:

shell> **addr2line -fie auth\_test\_plugin.so 0x9a6**

auth\_test\_plugin

mysql-trunk/plugin/auth/test\_plugin.c:65

The **addr2line** utility is part of the **binutils** package on Linux.

On Solaris, the procedure is similar. The Solaris **printstack()** already prints relative addresses:

plugin/auth/auth\_test\_plugin.so:0x1510

To translate, use this command:

shell> **gaddr2line -fie auth\_test\_plugin.so 0x1510**

mysql-trunk/plugin/auth/test\_plugin.c:88

Windows already prints the address, function name and line:

000007FEF07E10A4 auth\_test\_plugin.dll!auth\_test\_plugin()[test\_plugin.c:72]

#### 5.9.1.6 Using Server Logs to Find Causes of Errors in mysqld

Note that before starting [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the general query log enabled, you should check all your tables with [**myisamchk**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#myisamchk). See [Chapter 5, *MySQL Server Administration*](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html).

If [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) dies or hangs, you should start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the general query log enabled. See [Section 5.4.3, “The General Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#query-log). When [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) dies again, you can examine the end of the log file for the query that killed [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld).

If you use the default general query log file, the log is stored in the database directory as ***host\_name***.log In most cases it is the last query in the log file that killed [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), but if possible you should verify this by restarting [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) and executing the found query from the [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) command-line tools. If this works, you should also test all complicated queries that did not complete.

You can also try the command [**EXPLAIN**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#explain) on all [**SELECT**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#select) statements that takes a long time to ensure that [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) is using indexes properly. See [Section 13.8.2, “EXPLAIN Statement”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\sql-statements.html#explain).

You can find the queries that take a long time to execute by starting [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the slow query log enabled. See [Section 5.4.5, “The Slow Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#slow-query-log).

If you find the text **mysqld restarted** in the error log (normally a file named ***host\_name***.err) you probably have found a query that causes [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to fail. If this happens, you should check all your tables with [**myisamchk**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#myisamchk) (see [Chapter 5, *MySQL Server Administration*](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html)), and test the queries in the MySQL log files to see whether one fails. If you find such a query, try first upgrading to the newest MySQL version. If this does not help, report a bug, see [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports).

If you have started [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the [**myisam\_recover\_options**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_myisam_recover_options) system variable set, MySQL automatically checks and tries to repair **MyISAM** tables if they are marked as 'not closed properly' or 'crashed'. If this happens, MySQL writes an entry in the **hostname.err** file **'Warning: Checking table ...'** which is followed by **Warning: Repairing table** if the table needs to be repaired. If you get a lot of these errors, without [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) having died unexpectedly just before, then something is wrong and needs to be investigated further. See [Section 5.1.7, “Server Command Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#server-options).

When the server detects **MyISAM** table corruption, it writes additional information to the error log, such as the name and line number of the source file, and the list of threads accessing the table. Example: **Got an error from thread\_id=1, mi\_dynrec.c:368**. This is useful information to include in bug reports.

It is not a good sign if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) did die unexpectedly, but in this case, you should not investigate the **Checking table...** messages, but instead try to find out why [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) died.

#### 5.9.1.7 Making a Test Case If You Experience Table Corruption

The following procedure applies to [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) tables. For information about steps to take when encountering **InnoDB** table corruption, see [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports).

If you encounter corrupted [**MyISAM**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\storage-engines.html#myisam-storage-engine) tables or if [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) always fails after some update statements, you can test whether the issue is reproducible by doing the following:

1. Stop the MySQL daemon with [**mysqladmin shutdown**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqladmin).
2. Make a backup of the tables to guard against the very unlikely case that the repair does something bad.
3. Check all tables with [**myisamchk -s database/\*.MYI**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#myisamchk). Repair any corrupted tables with [**myisamchk -r database/*table*.MYI**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#myisamchk).
4. Make a second backup of the tables.
5. Remove (or move away) any old log files from the MySQL data directory if you need more space.
6. Start [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) with the binary log enabled. If you want to find a statement that crashes [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), you should start the server with the general query log enabled as well. See [Section 5.4.3, “The General Query Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#query-log), and [Section 5.4.4, “The Binary Log”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#binary-log).
7. When you have gotten a crashed table, stop the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server.
8. Restore the backup.
9. Restart the [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) server without the binary log enabled.
10. Re-execute the statements with [**mysqlbinlog binary-log-file | mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqlbinlog). The binary log is saved in the MySQL database directory with the name **hostname-bin.*NNNNNN***.
11. If the tables are corrupted again or you can get [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld) to die with the above command, you have found a reproducible bug. FTP the tables and the binary log to our bugs database using the instructions given in [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports). If you are a support customer, you can use the MySQL Customer Support Center (<https://www.mysql.com/support/>) to alert the MySQL team about the problem and have it fixed as soon as possible.

### 5.9.2 调试 MySQL 客户端

To be able to debug a MySQL client with the integrated debug package, you should configure MySQL with [-DWITH\_DEBUG=1](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_debug). See [Section 2.9.7, “MySQL Source-Configuration Options”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#source-configuration-options).

Before running a client, you should set the **MYSQL\_DEBUG** environment variable:

shell> **MYSQL\_DEBUG=d:t:O,/tmp/client.trace**

shell> **export MYSQL\_DEBUG**

This causes clients to generate a trace file in /tmp/client.trace.

If you have problems with your own client code, you should attempt to connect to the server and run your query using a client that is known to work. Do this by running [**mysql**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysql) in debugging mode (assuming that you have compiled MySQL with debugging on):

shell> **mysql --debug=d:t:O,/tmp/client.trace**

This provides useful information in case you mail a bug report. See [Section 1.6, “How to Report Bugs or Problems”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\introduction.html#bug-reports).

If your client crashes at some 'legal' looking code, you should check that your mysql.h include file matches your MySQL library file. A very common mistake is to use an old mysql.h file from an old MySQL installation with new MySQL library.

### 5.9.3  LOCK\_ORDER 工具

The MySQL server is a multithreaded application that uses numerous internal locking and lock-related primitives, such as mutexes, rwlocks (including prlocks and sxlocks), conditions, and files. Within the server, the set of lock-related objects changes with implementation of new features and code refactoring for performance improvements. As with any multithreaded application that uses locking primitives, there is always a risk of encountering a deadlock during execution when multiple locks are held at once. For MySQL, the effect of a deadlock is catastrophic, causing a complete loss of service.

As of MySQL 8.0.17, to enable detection of lock-acquisition deadlocks and enforcement that runtime execution is free of them, MySQL supports LOCK\_ORDER tooling. This enables a lock-order dependency graph to be defined as part of server design, and server runtime checking to ensure that lock acquisition is acyclic and that execution paths comply with the graph.

This section provides information about using the LOCK\_ORDER tool, but only at a basic level. For complete details, see the Lock Order section of the MySQL Server Doxygen documentation, available at <https://dev.mysql.com/doc/index-other.html>.

The LOCK\_ORDER tool is intended for debugging the server, not for production use.

To use the LOCK\_ORDER tool, follow this procedure:

1. Build MySQL from source, configuring it with the [-DWITH\_LOCK\_ORDER=ON](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_lock_order) **CMake** option so that the build includes LOCK\_ORDER tooling.

**Note**

With the [WITH\_LOCK\_ORDER](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\installing.html#option_cmake_with_lock_order) option enabled, MySQL builds require the **flex** program.

1. To run the server with the LOCK\_ORDER tool enabled, enable the [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) system variable at server startup. Several other system variables for LOCK\_ORDER configuration are available as well.
2. For MySQL test suite operation, **mysql-test-run.pl** has a --lock-order option that controls whether to enable the LOCK\_ORDER tool during test case execution.

The system variables described following configure operation of the LOCK\_ORDER tool, assuming that MySQL has been built to include LOCK\_ORDER tooling. The primary variable is [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order), which indicates whether to enable the LOCK\_ORDER tool at runtime:

* If [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) is disabled (the default), no other LOCK\_ORDER system variables have any effect.
* If [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) is enabled, the other system variables configure which LOCK\_ORDER features to enable.

**Note**

In general, it is intended that the LOCK\_ORDER tool be configured by executing **mysql-test-run.pl** with the --lock-order option, and for **mysql-test-run.pl** to set LOCK\_ORDER system variables to appropriate values.

All LOCK\_ORDER system variables must be set at server startup. At runtime, their values are visible but cannot be changed.

Some system variables exist in pairs, such as [**lock\_order\_debug\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_loop) and [**lock\_order\_trace\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_loop). For such pairs, the variables are distinguished as follows when the condition occurs with which they are associated:

* If the **\_debug\_** variable is enabled, a debug assertion is raised.
* If the **\_trace\_** variable is enabled, an error is printed to the logs.

**Table 5.7 LOCK\_ORDER System Variable Summary**

|  |  |  |
| --- | --- | --- |
| **Variable Name** | **Variable Type** | **Variable Scope** |
| [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) | Boolean | Global |
| [**lock\_order\_debug\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_loop) | Boolean | Global |
| [**lock\_order\_debug\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_arc) | Boolean | Global |
| [**lock\_order\_debug\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_key) | Boolean | Global |
| [**lock\_order\_debug\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_unlock) | Boolean | Global |
| [**lock\_order\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_dependencies) | File name | Global |
| [**lock\_order\_extra\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_extra_dependencies) | File name | Global |
| [**lock\_order\_output\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_output_directory) | Directory name | Global |
| [**lock\_order\_print\_txt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_print_txt) | Boolean | Global |
| [**lock\_order\_trace\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_loop) | Boolean | Global |
| [**lock\_order\_trace\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_arc) | Boolean | Global |
| [**lock\_order\_trace\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_key) | Boolean | Global |
| [**lock\_order\_trace\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_unlock) | Boolean | Global |

* **[lock\_order](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether to enable the LOCK\_ORDER tool at runtime. If [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) is disabled (the default), no other LOCK\_ORDER system variables have any effect. If [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) is enabled, the other system variables configure which LOCK\_ORDER features to enable.
* If [**lock\_order**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order) is enabled, an error is raised if the server encounters a lock-acquisition sequence that is not declared in the lock-order graph.

* **[lock\_order\_debug\_loop](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_debug_loop)**

|  |  |
| --- | --- |
| Command-Line Format | --lock-order-debug-loop[={OFF|ON}] |
| Introduced | 8.0.17 |
| System Variable | [**lock\_order\_debug\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_loop) |
| Scope | Global |
| Dynamic | No |
| [SET\_VAR](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var) Hint Applies | No |
| Type | Boolean |
| Default Value | **OFF** |

* Whether the LOCK\_ORDER tool causes a debug assertion failure when it encounters a dependency that is flagged as a loop in the lock-order graph.

* **[lock\_order\_debug\_missing\_arc](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_debug_missing_arc)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-debug-missing-arc[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_debug\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_arc) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the LOCK\_ORDER tool causes a debug assertion failure when it encounters a dependency that is not declared in the lock-order graph.

* **[lock\_order\_debug\_missing\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_debug_missing_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-debug-missing-key[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_debug\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_key) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the LOCK\_ORDER tool causes a debug assertion failure when it encounters an object that is not properly instrumented with the Performance Schema.

* **[lock\_order\_debug\_missing\_unlock](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_debug_missing_unlock)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-debug-missing-unlock[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_debug\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_debug_missing_unlock) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the LOCK\_ORDER tool causes a debug assertion failure when it encounters a lock that is destroyed while still held.

* **[lock\_order\_dependencies](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_dependencies)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-dependencies=file\_name** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_dependencies) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **empty string** |

* The path to the lock\_order\_dependencies.txt file that defines the server lock-order dependency graph.
* It is permitted to specify no dependencies. An empty dependency graph is used in this case.

* **[lock\_order\_extra\_dependencies](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_extra_dependencies)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-extra-dependencies=file\_name** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_extra\_dependencies**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_extra_dependencies) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | File name |
| **Default Value** | **empty string** |

* The path to a file containing additional dependencies for the lock-order dependency graph. This is useful to amend the primary server dependency graph, defined in the lock\_order\_dependencies.txt file, with additional dependencies describing the behavior of third party code. (The alternative is to modify lock\_order\_dependencies.txt itself, which is not encouraged.)
* If this variable is not set, no secondary file is used.

* **[lock\_order\_output\_directory](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_output_directory)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-output-directory=dir\_name** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_output\_directory**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_output_directory) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Directory name |
| **Default Value** | **empty string** |

* The directory where the LOCK\_ORDER tool writes its logs. If this variable is not set, the default is the current directory.

* **[lock\_order\_print\_txt](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_print_txt)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-print-txt[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_print\_txt**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_print_txt) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the LOCK\_ORDER tool performs a lock-order graph analysis and prints a textual report. The report includes any lock-acquisition cycles detected.

* **[lock\_order\_trace\_loop](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_trace_loop)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-trace-loop[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_trace\_loop**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_loop) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the LOCK\_ORDER tool prints a trace in the log file when it encounters a dependency that is flagged as a loop in the lock-order graph.

* **[lock\_order\_trace\_missing\_arc](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_trace_missing_arc)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-trace-missing-arc[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_trace\_missing\_arc**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_arc) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Whether the LOCK\_ORDER tool prints a trace in the log file when it encounters a dependency that is not declared in the lock-order graph.

* **[lock\_order\_trace\_missing\_key](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_trace_missing_key)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-trace-missing-key[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_trace\_missing\_key**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_key) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **OFF** |

* Whether the LOCK\_ORDER tool prints a trace in the log file when it encounters an object that is not properly instrumented with the Performance Schema.

* **[lock\_order\_trace\_missing\_unlock](file:///C:\\Users\\Administrator\\Downloads\\refman-8.0-en.html-chapter\\refman-8.0-en.html-chapter\\server-administration.html" \l "sysvar_lock_order_trace_missing_unlock)**

|  |  |
| --- | --- |
| **Command-Line Format** | **--lock-order-trace-missing-unlock[={OFF|ON}]** |
| **Introduced** | 8.0.17 |
| **System Variable** | [**lock\_order\_trace\_missing\_unlock**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_lock_order_trace_missing_unlock) |
| **Scope** | Global |
| **Dynamic** | No |
| [**SET\_VAR**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\optimization.html#optimizer-hints-set-var)**Hint Applies** | No |
| **Type** | Boolean |
| **Default Value** | **ON** |

* Whether the LOCK\_ORDER tool prints a trace in the log file when it encounters a lock that is destroyed while still held.

### 5.9.4 DBUG 包

The MySQL server and most MySQL clients are compiled with the DBUG package originally created by Fred Fish. When you have configured MySQL for debugging, this package makes it possible to get a trace file of what the program is doing. See [Section 5.9.1.2, “Creating Trace Files”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#making-trace-files).

This section summarizes the argument values that you can specify in debug options on the command line for MySQL programs that have been built with debugging support.

The DBUG package can be used by invoking a program with the --debug[=***debug\_options***] or -# [***debug\_options***] option. If you specify the --debug or -# option without a ***debug\_options*** value, most MySQL programs use a default value. The server default is **d:t:i:o,/tmp/mysqld.trace** on Unix and **d:t:i:O,\mysqld.trace** on Windows. The effect of this default is:

* **d**: Enable output for all debug macros
* **t**: Trace function calls and exits
* **i**: Add PID to output lines
* **o,/tmp/mysqld.trace**, **O,\mysqld.trace**: Set the debug output file.

Most client programs use a default ***debug\_options*** value of **d:t:o,/tmp/*program\_name*.trace**, regardless of platform.

Here are some example debug control strings as they might be specified on a shell command line:

--debug=d:t

--debug=d:f,main,subr1:F:L:t,20

--debug=d,input,output,files:n

--debug=d:t:i:O,\\mysqld.trace

For [**mysqld**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\programs.html#mysqld), it is also possible to change DBUG settings at runtime by setting the [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug) system variable. This variable has global and session values:

mysql> **SET GLOBAL debug = '*debug\_options*';**

mysql> **SET SESSION debug = '*debug\_options*';**

Changing the global [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug) value requires privileges sufficient to set global system variables. Changing the session [**debug**](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#sysvar_debug) value requires privileges sufficient to set restricted session system variables. See [Section 5.1.9.1, “System Variable Privileges”](file:///C:\Users\Administrator\Downloads\refman-8.0-en.html-chapter\refman-8.0-en.html-chapter\server-administration.html#system-variable-privileges).

The ***debug\_options*** value is a sequence of colon-separated fields:

field\_1:field\_2:...:field\_***N***

Each field within the value consists of a mandatory flag character, optionally preceded by a **+** or **-** character, and optionally followed by a comma-separated list of modifiers:

[+|-]flag[,modifier,modifier,...,modifier]

The following table describes the permitted flag characters. Unrecognized flag characters are silently ignored.

| **Flag** | **Description** |
| --- | --- |
| **d** | Enable output from DBUG\_***XXX*** macros for the current state. May be followed by a list of keywords, which enables output only for the DBUG macros with that keyword. An empty list of keywords enables output for all macros.  In MySQL, common debug macro keywords to enable are **enter**, **exit**, **error**, **warning**, **info**, and **loop**. |
| **D** | Delay after each debugger output line. The argument is the delay, in tenths of seconds, subject to machine capabilities. For example, **D,20** specifies a delay of two seconds. |
| **f** | Limit debugging, tracing, and profiling to the list of named functions. An empty list enables all functions. The appropriate **d** or **t** flags must still be given; this flag only limits their actions if they are enabled. |
| **F** | Identify the source file name for each line of debug or trace output. |
| **i** | Identify the process with the PID or thread ID for each line of debug or trace output. |
| **L** | Identify the source file line number for each line of debug or trace output. |
| **n** | Print the current function nesting depth for each line of debug or trace output. |
| **N** | Number each line of debug output. |
| **o** | Redirect the debugger output stream to the specified file. The default output is **stderr**. |
| **O** | Like **o**, but the file is really flushed between each write. When needed, the file is closed and reopened between each write. |
| **p** | Limit debugger actions to specified processes. A process must be identified with the **DBUG\_PROCESS** macro and match one in the list for debugger actions to occur. |
| **P** | Print the current process name for each line of debug or trace output. |
| **r** | When pushing a new state, do not inherit the previous state's function nesting level. Useful when the output is to start at the left margin. |
| **S** | Do function **\_sanity(\_file\_,\_line\_)** at each debugged function until **\_sanity()** returns something that differs from 0. |
| **t** | Enable function call/exit trace lines. May be followed by a list (containing only one modifier) giving a numeric maximum trace level, beyond which no output occurs for either debugging or tracing macros. The default is a compile time option. |

The leading **+** or **-** character and trailing list of modifiers are used for flag characters such as **d** or **f** that can enable a debug operation for all applicable modifiers or just some of them:

* With no leading **+** or **-**, the flag value is set to exactly the modifier list as given.
* With a leading **+** or **-**, the modifiers in the list are added to or subtracted from the current modifier list.

The following examples show how this works for the **d** flag. An empty **d** list enabled output for all debug macros. A nonempty list enables output only for the macro keywords in the list.

These statements set the **d** value to the modifier list as given:

mysql> **SET debug = 'd';**

mysql> **SELECT @@debug;**

+---------+

| @@debug |

+---------+

| d |

+---------+

mysql> **SET debug = 'd,error,warning';**

mysql> **SELECT @@debug;**

+-----------------+

| @@debug |

+-----------------+

| d,error,warning |

+-----------------+

A leading **+** or **-** adds to or subtracts from the current **d** value:

mysql> **SET debug = '+d,loop';**

mysql> **SELECT @@debug;**

+----------------------+

| @@debug |

+----------------------+

| d,error,warning,loop |

+----------------------+

mysql> **SET debug = '-d,error,loop';**

mysql> **SELECT @@debug;**

+-----------+

| @@debug |

+-----------+

| d,warning |

+-----------+

Adding to “all macros enabled” results in no change:

mysql> **SET debug = 'd';**

mysql> **SELECT @@debug;**

+---------+

| @@debug |

+---------+

| d |

+---------+

mysql> **SET debug = '+d,loop';**

mysql> **SELECT @@debug;**

+---------+

| @@debug |

+---------+

| d |

+---------+

Disabling all enabled macros disables the **d** flag entirely:

mysql> SET debug = 'd,error,loop';

mysql> SELECT @@debug;

+--------------+

| @@debug |

+--------------+

| d,error,loop |

+--------------+

mysql> SET debug = '-d,error,loop';

mysql> SELECT @@debug;

+---------+

| @@debug |

+---------+

| |

+---------+