

```
page 1663 okay: 2.863% done
page 8447 okay: 14.537% done
page 13695 okay: 23.568% done
page 18815 okay: 32.379% done
page 23039 okay: 39.648% done
page 28351 okay: 48.789% done
page 33023 okay: 56.828% done
page 37951 okay: 65.308% done
page 44095 okay: 75.881% done
page 49407 okay: 85.022% done
page 54463 okay: 93.722% done
...
```

- **--count, -c**

Print a count of the number of pages in the file and exit. Example usage:

```
innocheksum --count ../data/test/tab1.ibd
```

- **--start-page=num, -s num**

Start at this page number. Example usage:

```
innocheksum --start-page=600 ../data/test/tab1.ibd
```

or:

```
innocheksum -s 600 ../data/test/tab1.ibd
```

- **--end-page=num, -e num**

End at this page number. Example usage:

```
innocheksum --end-page=700 ../data/test/tab1.ibd
```

or:

```
innocheksum --p 700 ../data/test/tab1.ibd
```

- **--page=num, -p num**

Check only this page number. Example usage:

```
innocheksum --page=701 ../data/test/tab1.ibd
```

- `--strict-check, -C`

Specify a strict checksum algorithm. Options include `innodb`, `crc32`, and `none`.

In this example, the `innodb` checksum algorithm is specified:

```
innocheksum --strict-check=innodb ../data/test/tab1.ibd
```

In this example, the `crc32` checksum algorithm is specified:

```
innocheksum -C crc32 ../data/test/tab1.ibd
```

The following conditions apply:

- If you do not specify the `--strict-check` option, `innocheksum` validates against `innodb`, `crc32` and `none`.
  - If you specify the `none` option, only checksums generated by `none` are allowed.
  - If you specify the `innodb` option, only checksums generated by `innodb` are allowed.
  - If you specify the `crc32` option, only checksums generated by `crc32` are allowed.
- `--no-check, -n`

Ignore the checksum verification when rewriting a checksum. This option may only be used with the `innocheksum --write` option. If the `--write` option is not specified, `innocheksum` terminates.

In this example, an `innodb` checksum is rewritten to replace an invalid checksum:

```
innocheksum --no-check --write innodb ../data/test/tab1.ibd
```

- `--allow-mismatches, -a`

The maximum number of checksum mismatches allowed before `innocheksum` terminates. The default setting is 0. If `--allow-mismatches=N`, where  $N \geq 0$ ,  $N$  mismatches are permitted and `innocheksum` terminates at  $N+1$ . When `--allow-mismatches` is set to 0, `innocheksum` terminates on the first checksum mismatch.

In this example, an existing `innodb` checksum is rewritten to set `--allow-mismatches` to 1.

```
innocheksum --allow-mismatches=1 --write innodb ../data/test/tab1.ibd
```

With `--allow-mismatches` set to 1, if there is a mismatch at page 600 and another at page 700 on a file with 1000 pages, the checksum is updated for pages 0-599 and 601-699. Because `--allow-mismatches` is set to 1, the checksum tolerates the first mismatch and terminates on the second mismatch, leaving page 600 and pages 700-999 unchanged.

- `--write=name, -w num`

Rewrite a checksum. When rewriting an invalid checksum, the `--no-check` option must be used together with the `--write` option. The `--no-check` option tells `innocheksum` to ignore

verification of the invalid checksum. You do not have to specify the `--no-check` option if the current checksum is valid.

An algorithm must be specified when using the `--write` option. Possible values for the `--write` option are:

- `innodb`: A checksum calculated in software, using the original algorithm from InnoDB.
- `crc32`: A checksum calculated using the `crc32` algorithm, possibly done with a hardware assist.
- `none`: A constant number.

The `--write` option rewrites entire pages to disk. If the new checksum is identical to the existing checksum, the new checksum is not written to disk in order to minimize I/O.

`innocheksum` obtains an exclusive lock when the `--write` option is used.

In this example, a `crc32` checksum is written for `tab1.ibd`:

```
innocheksum -w crc32 ../data/test/tab1.ibd
```

In this example, a `crc32` checksum is rewritten to replace an invalid `crc32` checksum:

```
innocheksum --no-check --write crc32 ../data/test/tab1.ibd
```

- `--page-type-summary, -S`

Display a count of each page type in a tablespace. Example usage:

```
innocheksum --page-type-summary ../data/test/tab1.ibd
```

Sample output for `--page-type-summary`:

```
File:../data/test/tab1.ibd
=====
PAGE TYPE SUMMARY=====
#PAGE_COUNT PAGE_TYPE
=====
2 Index page
0 Undo log page
1 Inode page
0 Insert buffer free list page
2 Freshly allocated page
1 Insert buffer bitmap
0 System page
0 Transaction system page
1 File Space Header
0 Extent descriptor page
0 BLOB page
0 Compressed BLOB page
0 Other type of page
=====
Additional information:
Undo page type: 0 insert, 0 update, 0 other
Undo page state: 0 active, 0 cached, 0 to_free, 0 to_purge, 0 prepared, 0 other
```

- `--page-type-dump, -D`

Dump the page type information for each page in a tablespace to `stderr` or `stdout`. Example usage:

```
innocheksum --page-type-dump=/tmp/a.txt ../data/test/tab1.ibd
```

- `--log, -l`

Log output for the `innocheksum` tool. A log file name must be provided. Log output contains checksum values for each tablespace page. For uncompressed tables, LSN values are also

provided. The `--log` replaces the `--debug` option, which was available in earlier releases. Example usage:

```
innocheksum --log=/tmp/log.txt ./data/test/tab1.ibd
```

or:

```
innocheksum -l /tmp/log.txt ./data/test/tab1.ibd
```

- `-` option.

Specify the `-` option to read from standard input. If the `-` option is missing when “read from standard in” is expected, `innocheksum` prints `innocheksum` usage information indicating that the “`-`” option was omitted. Example usages:

```
cat t1.ibd | nochecksum -
```

In this example, `innocheksum` writes the `crc32` checksum algorithm to `a.ibd` without changing the original `t1.ibd` file.

```
cat t1.ibd | nochecksum --write=crc32 - > a.ibd
```

## Running `innocheksum` on Multiple User-defined Tablespace Files

The following examples demonstrate how to run `innocheksum` on multiple user-defined tablespace files (`.ibd` files).

Run `innocheksum` for all tablespace (`.ibd`) files in the “test” database:

```
nochecksum ./data/test/*.ibd
```

Run `innocheksum` for all tablespace files (`.ibd` files) that have a file name starting with “t”:

```
nochecksum ./data/test/t*.ibd
```

Run `innocheksum` for all tablespace files (`.ibd` files) in the `data` directory:

```
nochecksum ./data/**.ibd
```

### Note



Running `innocheksum` on multiple user-defined tablespace files is not supported on Windows operating systems, as Windows shells such as `cmd.exe` do not support glob pattern expansion. On Windows systems, `innocheksum` must be run separately for each user-defined tablespace file. For example:

```
nochecksum.exe t1.ibd  
nochecksum.exe t2.ibd  
nochecksum.exe t3.ibd
```

## Running `innocheksum` on Multiple System Tablespace Files

By default, there is only one `InnoDB` system tablespace file (`ibdata1`) but multiple files for the system tablespace can be defined using the `innodb_data_file_path` option. In the following example, three files for the system tablespace are defined using the `innodb_data_file_path` option: `ibdata1`, `ibdata2`, and `ibdata3`.

```
./bin/mysqld --no-defaults --innodb-data-file-path="ibdata1:10M;ibdata2:10M;ibdata3:10M:autoextend"
```

The three files (`ibdata1`, `ibdata2`, and `ibdata3`) form one logical system tablespace. To run `innocheksum` on multiple files that form one logical system tablespace, `innocheksum` requires the `-` option to read tablespace files in from standard input, which is equivalent to concatenating multiple

files to create one single file. For the example provided above, the following `innochecksum` command would be used:

```
cat ibdata* | innochecksum -
```

Refer to the `innochecksum` options information for more information about the “-” option.



#### Note

Running `innochecksum` on multiple files in the same tablespace is not supported on Windows operating systems, as Windows shells such as `cmd.exe` do not support glob pattern expansion. On Windows systems, `innochecksum` must be run separately for each system tablespace file. For example:

```
innochecksum.exe ibdata1
innochecksum.exe ibdata2
innochecksum.exe ibdata3
```

### 4.6.3 myisam\_ftdump — Display Full-Text Index information

`myisam_ftdump` displays information about `FULLTEXT` indexes in `MyISAM` tables. It reads the `MyISAM` index file directly, so it must be run on the server host where the table is located. Before using `myisam_ftdump`, be sure to issue a `FLUSH TABLES` statement first if the server is running.

`myisam_ftdump` scans and dumps the entire index, which is not particularly fast. On the other hand, the distribution of words changes infrequently, so it need not be run often.

Invoke `myisam_ftdump` like this:

```
myisam_ftdump [options] tbl_name index_num
```

The `tbl_name` argument should be the name of a `MyISAM` table. You can also specify a table by naming its index file (the file with the `.MYI` suffix). If you do not invoke `myisam_ftdump` in the directory where the table files are located, the table or index file name must be preceded by the path name to the table's database directory. Index numbers begin with 0.

Example: Suppose that the `test` database contains a table named `mytexttable` that has the following definition:

```
CREATE TABLE mytexttable
(
    id INT NOT NULL,
    txt TEXT NOT NULL,
    PRIMARY KEY (id),
    FULLTEXT (txt)
) ENGINE=MyISAM;
```

The index on `id` is index 0 and the `FULLTEXT` index on `txt` is index 1. If your working directory is the `test` database directory, invoke `myisam_ftdump` as follows:

```
myisam_ftdump mytexttable 1
```

If the path name to the `test` database directory is `/usr/local/mysql/data/test`, you can also specify the table name argument using that path name. This is useful if you do not invoke `myisam_ftdump` in the database directory:

```
myisam_ftdump /usr/local/mysql/data/test/mytexttable 1
```

You can use `myisam_ftdump` to generate a list of index entries in order of frequency of occurrence like this on Unix-like systems:

```
myisam_ftdump -c mytexttable 1 | sort -r
```

On Windows, use:

```
myisam_ftdump -c mytexttable 1 | sort /R
```

`myisam_ftdump` supports the following options:

- `--help, -h -?`

Display a help message and exit.

- `--count, -c`

Calculate per-word statistics (counts and global weights).

- `--dump, -d`

Dump the index, including data offsets and word weights.

- `--length, -l`

Report the length distribution.

- `--stats, -s`

Report global index statistics. This is the default operation if no other operation is specified.

- `--verbose, -v`

Verbose mode. Print more output about what the program does.

#### 4.6.4 myisamchk — MyISAM Table-Maintenance Utility

The `myisamchk` utility gets information about your database tables or checks, repairs, or optimizes them. `myisamchk` works with MyISAM tables (tables that have `.MYD` and `.MYI` files for storing data and indexes).

You can also use the `CHECK TABLE` and `REPAIR TABLE` statements to check and repair MyISAM tables. See [Section 13.7.3.2, “CHECK TABLE Statement”](#), and [Section 13.7.3.5, “REPAIR TABLE Statement”](#).

The use of `myisamchk` with partitioned tables is not supported.



##### Caution

It is best to make a backup of a table before performing a table repair operation; under some circumstances the operation might cause data loss. Possible causes include but are not limited to file system errors.

Invoke `myisamchk` like this:

```
myisamchk [options] tbl_name ...
```

The `options` specify what you want `myisamchk` to do. They are described in the following sections. You can also get a list of options by invoking `myisamchk --help`.

With no options, `myisamchk` simply checks your table as the default operation. To get more information or to tell `myisamchk` to take corrective action, specify options as described in the following discussion.

`tbl_name` is the database table you want to check or repair. If you run `myisamchk` somewhere other than in the database directory, you must specify the path to the database directory, because `myisamchk` has no idea where the database is located. In fact, `myisamchk` does not actually care

whether the files you are working on are located in a database directory. You can copy the files that correspond to a database table into some other location and perform recovery operations on them there.

You can name several tables on the `myisamchk` command line if you wish. You can also specify a table by naming its index file (the file with the `.MYI` suffix). This enables you to specify all tables in a directory by using the pattern `*.MYI`. For example, if you are in a database directory, you can check all the `MyISAM` tables in that directory like this:

```
myisamchk *.MYI
```

If you are not in the database directory, you can check all the tables there by specifying the path to the directory:

```
myisamchk /path/to/database_dir/*.MYI
```

You can even check all tables in all databases by specifying a wildcard with the path to the MySQL data directory:

```
myisamchk /path/to/datadir/*/*.MYI
```

The recommended way to quickly check all `MyISAM` tables is:

```
myisamchk --silent --fast /path/to/datadir/*/*.MYI
```

If you want to check all `MyISAM` tables and repair any that are corrupted, you can use the following command:

```
myisamchk --silent --force --fast --update-state \  
--key_buffer_size=64M --myisam_sort_buffer_size=64M \  
--read_buffer_size=1M --write_buffer_size=1M \  
/path/to/datadir/*/*.MYI
```

This command assumes that you have more than 64MB free. For more information about memory allocation with `myisamchk`, see [Section 4.6.4.6, “myisamchk Memory Usage”](#).

For additional information about using `myisamchk`, see [Section 7.6, “MyISAM Table Maintenance and Crash Recovery”](#).



### Important

*You must ensure that no other program is using the tables while you are running `myisamchk`.* The most effective means of doing so is to shut down the MySQL server while running `myisamchk`, or to lock all tables that `myisamchk` is being used on.

Otherwise, when you run `myisamchk`, it may display the following error message:

```
warning: clients are using or haven't closed the table properly
```

This means that you are trying to check a table that has been updated by another program (such as the `mysqld` server) that hasn't yet closed the file or that has died without closing the file properly, which can sometimes lead to the corruption of one or more `MyISAM` tables.

If `mysqld` is running, you must force it to flush any table modifications that are still buffered in memory by using `FLUSH TABLES`. You should then ensure that no one is using the tables while you are running `myisamchk`.

However, the easiest way to avoid this problem is to use `CHECK TABLE` instead of `myisamchk` to check tables. See [Section 13.7.3.2, “CHECK TABLE Statement”](#).

`myisamchk` supports the following options, which can be specified on the command line or in the [`myisamchk`] group of an option file. For information about option files used by MySQL programs, see Section 4.2.2.2, “Using Option Files”.

**Table 4.19 myisamchk Options**

Option Name	Description
<code>--analyze</code>	Analyze the distribution of key values
<code>--backup</code>	Make a backup of the .MYD file as file_name-time.BAK
<code>--block-search</code>	Find the record that a block at the given offset belongs to
<code>--check</code>	Check the table for errors
<code>--check-only-changed</code>	Check only tables that have changed since the last check
<code>--correct-checksum</code>	Correct the checksum information for the table
<code>--data-file-length</code>	Maximum length of the data file (when re-creating data file when it is full)
<code>--debug</code>	Write debugging log
<code>--decode_bits</code>	Decode_bits
<code>--defaults-extra-file</code>	Read named option file in addition to usual option files
<code>--defaults-file</code>	Read only named option file
<code>--defaults-group-suffix</code>	Option group suffix value
<code>--description</code>	Print some descriptive information about the table
<code>--extend-check</code>	Do very thorough table check or repair that tries to recover every possible row from the data file
<code>--fast</code>	Check only tables that haven't been closed properly
<code>--force</code>	Do a repair operation automatically if myisamchk finds any errors in the table
<code>--force</code>	Overwrite old temporary files. For use with the <code>-r</code> or <code>-o</code> option
<code>--ft_max_word_len</code>	Maximum word length for FULLTEXT indexes
<code>--ft_min_word_len</code>	Minimum word length for FULLTEXT indexes
<code>--ft_stopword_file</code>	Use stopwords from this file instead of built-in list
<code>--HELP</code>	Display help message and exit
<code>--help</code>	Display help message and exit
<code>--information</code>	Print informational statistics about the table that is checked
<code>--key_buffer_size</code>	Size of buffer used for index blocks for MyISAM tables
<code>--keys-used</code>	A bit-value that indicates which indexes to update
<code>--max-record-length</code>	Skip rows larger than the given length if myisamchk cannot allocate memory to hold them
<code>--medium-check</code>	Do a check that is faster than an <code>--extend-check</code> operation
<code>--myisam_block_size</code>	Block size to be used for MyISAM index pages

Option Name	Description
--myisam_sort_buffer_size	The buffer that is allocated when sorting the index when doing a REPAIR or when creating indexes with CREATE INDEX or ALTER TABLE
--no-defaults	Read no option files
--parallel-recover	Uses the same technique as -r and -n, but creates all the keys in parallel, using different threads (beta)
--print-defaults	Print default options
--quick	Achieve a faster repair by not modifying the data file
--read_buffer_size	Each thread that does a sequential scan allocates a buffer of this size for each table it scans
--read-only	Do not mark the table as checked
--recover	Do a repair that can fix almost any problem except unique keys that aren't unique
--safe-recover	Do a repair using an old recovery method that reads through all rows in order and updates all index trees based on the rows found
--set-auto-increment	Force AUTO_INCREMENT numbering for new records to start at the given value
--set-collation	Specify the collation to use for sorting table indexes
--silent	Silent mode
--sort_buffer_size	The buffer that is allocated when sorting the index when doing a REPAIR or when creating indexes with CREATE INDEX or ALTER TABLE
--sort-index	Sort the index tree blocks in high-low order
--sort_key_blocks	sort_key_blocks
--sort-records	Sort records according to a particular index
--sort-recover	Force myisamchk to use sorting to resolve the keys even if the temporary files would be very large
--stats_method	Specifies how MyISAM index statistics collection code should treat NULLs
--tmpdir	Directory to be used for storing temporary files
--unpack	Unpack a table that was packed with myisampack
--update-state	Store information in the .MYI file to indicate when the table was checked and whether the table crashed
--verbose	Verbose mode
--version	Display version information and exit
--write_buffer_size	Write buffer size

#### 4.6.4.1 myisamchk General Options

The options described in this section can be used for any type of table maintenance operation performed by `myisamchk`. The sections following this one describe options that pertain only to specific operations, such as table checking or repairing.

- `--help, -?`

Display a help message and exit. Options are grouped by type of operation.

- `--HELP, -H`

Display a help message and exit. Options are presented in a single list.

- `--debug=debug_options, -# debug_options`

Write a debugging log. A typical `debug_options` string is `d:t:o,file_name`. The default is `d:t:o,/tmp/myisamchk.trace`.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `--defaults-extra-file=file_name`

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.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--defaults-file=file_name`

Use 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.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--defaults-group-suffix=str`

Read not only the usual option groups, but also groups with the usual names and a suffix of `str`.

For example, `myisamchk` normally reads the `[myisamchk]` group. If this option is given as `--defaults-group-suffix=_other`, `myisamchk` also reads the `[myisamchk_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”](#).

- `--no-defaults`

Do not read any option files. If program startup fails due to reading unknown options from an option file, `--no-defaults` can be used to prevent them from being read.

The exception is that the `.mylogin.cnf` file is read in all cases, if it exists. This permits passwords to be specified in a safer way than on the command line even when `--no-defaults` is used. To create `.mylogin.cnf`, use the `mysql_config_editor` utility. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--print-defaults`

Print the program name and all options that it gets from option files.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--silent, -s`

Silent mode. Write output only when errors occur. You can use `-s` twice (`-ss`) to make `myisamchk` very silent.

- `--verbose, -v`

Verbose mode. Print more information about what the program does. This can be used with `-d` and `-e`. Use `-v` multiple times (`-vv, -vvv`) for even more output.

- `--version, -V`

Display version information and exit.

- `--wait, -w`

Instead of terminating with an error if the table is locked, wait until the table is unlocked before continuing. If you are running `mysqld` with external locking disabled, the table can be locked only by another `myisamchk` command.

You can also set the following variables by using `--var_name=value` syntax:

Variable	Default Value
<code>decode_bits</code>	9
<code>ft_max_word_len</code>	version-dependent
<code>ft_min_word_len</code>	4
<code>ft_stopword_file</code>	built-in list
<code>key_buffer_size</code>	523264
<code>myisam_block_size</code>	1024
<code>myisam_sort_key_blocks</code>	16
<code>read_buffer_size</code>	262136
<code>sort_buffer_size</code>	2097144
<code>sort_key_blocks</code>	16
<code>stats_method</code>	nulls Unequal
<code>write_buffer_size</code>	262136

The possible `myisamchk` variables and their default values can be examined with `myisamchk --help`:

`myisam_sort_buffer_size` is used when the keys are repaired by sorting keys, which is the normal case when you use `--recover`. `sort_buffer_size` is a deprecated synonym for `myisam_sort_buffer_size`.

`key_buffer_size` is used when you are checking the table with `--extend-check` or when the keys are repaired by inserting keys row by row into the table (like when doing normal inserts). Repairing through the key buffer is used in the following cases:

- You use `--safe-recover`.
- The temporary files needed to sort the keys would be more than twice as big as when creating the key file directly. This is often the case when you have large key values for `CHAR`, `VARCHAR`, or `TEXT` columns, because the sort operation needs to store the complete key values as it proceeds. If you have lots of temporary space and you can force `myisamchk` to repair by sorting, you can use the `--sort-recover` option.

Repairing through the key buffer takes much less disk space than using sorting, but is also much slower.

If you want a faster repair, set the `key_buffer_size` and `myisam_sort_buffer_size` variables to about 25% of your available memory. You can set both variables to large values, because only one of them is used at a time.

`myisam_block_size` is the size used for index blocks.

`stats_method` influences how `NULL` values are treated for index statistics collection when the `--analyze` option is given. It acts like the `myisam_stats_method` system variable. For more information, see the description of `myisam_stats_method` in [Section 5.1.8, “Server System Variables”](#), and [Section 8.3.8, “InnoDB and MyISAM Index Statistics Collection”](#).

`ft_min_word_len` and `ft_max_word_len` indicate the minimum and maximum word length for `FULLTEXT` indexes on `MyISAM` tables. `ft_stopword_file` names the stopword file. These need to be set under the following circumstances.

If you use `myisamchk` to perform an operation that modifies table indexes (such as repair or analyze), the `FULLTEXT` indexes are rebuilt using the default full-text parameter values for minimum and maximum word length and the stopword file unless you specify otherwise. This can result in queries failing.

The problem occurs because these parameters are known only by the server. They are not stored in `MyISAM` index files. To avoid the problem if you have modified the minimum or maximum word length or the stopword file in the server, specify the same `ft_min_word_len`, `ft_max_word_len`, and `ft_stopword_file` values to `myisamchk` that you use for `mysqld`. For example, if you have set the minimum word length to 3, you can repair a table with `myisamchk` like this:

```
myisamchk --recover --ft_min_word_len=3 tbl_name.MYI
```

To ensure that `myisamchk` and the server use the same values for full-text parameters, you can place each one in both the `[mysqld]` and `[myisamchk]` sections of an option file:

```
[mysqld]
ft_min_word_len=3

[myisamchk]
ft_min_word_len=3
```

An alternative to using `myisamchk` is to use the `REPAIR TABLE`, `ANALYZE TABLE`, `OPTIMIZE TABLE`, or `ALTER TABLE`. These statements are performed by the server, which knows the proper full-text parameter values to use.

#### 4.6.4.2 myisamchk Check Options

`myisamchk` supports the following options for table checking operations:

- `--check`, `-c`

Check the table for errors. This is the default operation if you specify no option that selects an operation type explicitly.

- `--check-only-changed`, `-C`

Check only tables that have changed since the last check.

- `--extend-check`, `-e`

Check the table very thoroughly. This is quite slow if the table has many indexes. This option should only be used in extreme cases. Normally, `myisamchk` or `myisamchk --medium-check` should be able to determine whether there are any errors in the table.

If you are using `--extend-check` and have plenty of memory, setting the `key_buffer_size` variable to a large value helps the repair operation run faster.

See also the description of this option under table repair options.

For a description of the output format, see [Section 4.6.4.5, “Obtaining Table Information with myisamchk”](#).

- `--fast, -F`

Check only tables that haven't been closed properly.

- `--force, -f`

Do a repair operation automatically if `myisamchk` finds any errors in the table. The repair type is the same as that specified with the `--recover` or `-r` option.

- `--information, -i`

Print informational statistics about the table that is checked.

- `--medium-check, -m`

Do a check that is faster than an `--extend-check` operation. This finds only 99.99% of all errors, which should be good enough in most cases.

- `--read-only, -T`

Do not mark the table as checked. This is useful if you use `myisamchk` to check a table that is in use by some other application that does not use locking, such as `mysqld` when run with external locking disabled.

- `--update-state, -U`

Store information in the `.MYI` file to indicate when the table was checked and whether the table crashed. This should be used to get full benefit of the `--check-only-changed` option, but you shouldn't use this option if the `mysqld` server is using the table and you are running it with external locking disabled.

#### 4.6.4.3 myisamchk Repair Options

`myisamchk` supports the following options for table repair operations (operations performed when an option such as `--recover` or `--safe-recover` is given):

- `--backup, -B`

Make a backup of the `.MYD` file as `file_name-time.BAK`

- `--character-sets-dir=dir_name`

The directory where character sets are installed. See [Section 10.15, “Character Set Configuration”](#).

- `--correct-checksum`

Correct the checksum information for the table.

- `--data-file-length=len, -D len`

The maximum length of the data file (when re-creating data file when it is “full”).

- `--extend-check, -e`

Do a repair that tries to recover every possible row from the data file. Normally, this also finds a lot of garbage rows. Do not use this option unless you are desperate.

See also the description of this option under table checking options.

For a description of the output format, see [Section 4.6.4.5, “Obtaining Table Information with myisamchk”](#).

- `--force, -f`

Overwrite old intermediate files (files with names like `tbl_name.TMD`) instead of aborting.

- `--keys-used=val, -k val`

For `myisamchk`, the option value is a bit value that indicates which indexes to update. Each binary bit of the option value corresponds to a table index, where the first index is bit 0. An option value of 0 disables updates to all indexes, which can be used to get faster inserts. Deactivated indexes can be reactivated by using `myisamchk -r`.

- `--no-symlinks, -l`

Do not follow symbolic links. Normally `myisamchk` repairs the table that a symlink points to. This option does not exist as of MySQL 4.0 because versions from 4.0 on do not remove symlinks during repair operations.

- `--max-record-length=len`

Skip rows larger than the given length if `myisamchk` cannot allocate memory to hold them.

- `--parallel-recover, -p`



#### Note

This option is deprecated in MySQL 8.0.28 and removed in MySQL 8.0.30.

Use the same technique as `-r` and `-n`, but create all the keys in parallel, using different threads.  
*This is beta-quality code. Use at your own risk!*

- `--quick, -q`

Achieve a faster repair by modifying only the index file, not the data file. You can specify this option twice to force `myisamchk` to modify the original data file in case of duplicate keys.

- `--recover, -r`

Do a repair that can fix almost any problem except unique keys that are not unique (which is an extremely unlikely error with MyISAM tables). If you want to recover a table, this is the option to try first. You should try `--safe-recover` only if `myisamchk` reports that the table cannot be recovered using `--recover`. (In the unlikely case that `--recover` fails, the data file remains intact.)

If you have lots of memory, you should increase the value of `myisam_sort_buffer_size`.

- `--safe-recover, -o`

Do a repair using an old recovery method that reads through all rows in order and updates all index trees based on the rows found. This is an order of magnitude slower than `--recover`, but can handle a couple of very unlikely cases that `--recover` cannot. This recovery method also uses much less disk space than `--recover`. Normally, you should repair first using `--recover`, and then with `--safe-recover` only if `--recover` fails.

If you have lots of memory, you should increase the value of `key_buffer_size`.

- `--set-collation=name`

Specify the collation to use for sorting table indexes. The character set name is implied by the first part of the collation name.

- `--sort-recover, -n`

Force `myisamchk` to use sorting to resolve the keys even if the temporary files would be very large.

- `--tmpdir=dir_name, -t dir_name`

The path of the directory to be used for storing temporary files. If this is not set, `myisamchk` uses the value of the `TMPDIR` environment variable. `--tmpdir` can be set to a list of directory paths that are used successively in round-robin fashion for creating temporary files. The separator character between directory names is the colon (:) on Unix and the semicolon (;) on Windows.

- `--unpack, -u`

Unpack a table that was packed with `myisampack`.

#### 4.6.4.4 Other myisamchk Options

`myisamchk` supports the following options for actions other than table checks and repairs:

- `--analyze, -a`

Analyze the distribution of key values. This improves join performance by enabling the join optimizer to better choose the order in which to join the tables and which indexes it should use. To obtain information about the key distribution, use a `myisamchk --description --verbose tbl_name` command or the `SHOW INDEX FROM tbl_name` statement.

- `--block-search=offset, -b offset`

Find the record that a block at the given offset belongs to.

- `--description, -d`

Print some descriptive information about the table. Specifying the `--verbose` option once or twice produces additional information. See [Section 4.6.4.5, “Obtaining Table Information with myisamchk”](#).

- `--set-auto-increment[=value], -A[value]`

Force `AUTO_INCREMENT` numbering for new records to start at the given value (or higher, if there are existing records with `AUTO_INCREMENT` values this large). If `value` is not specified, `AUTO_INCREMENT` numbers for new records begin with the largest value currently in the table, plus one.

- `--sort-index, -S`

Sort the index tree blocks in high-low order. This optimizes seeks and makes table scans that use indexes faster.

- `--sort-records=N, -R N`

Sort records according to a particular index. This makes your data much more localized and may speed up range-based `SELECT` and `ORDER BY` operations that use this index. (The first time you use this option to sort a table, it may be very slow.) To determine a table's index numbers, use `SHOW INDEX`, which displays a table's indexes in the same order that `myisamchk` sees them. Indexes are numbered beginning with 1.

If keys are not packed (`PACK_KEYS=0`), they have the same length, so when `myisamchk` sorts and moves records, it just overwrites record offsets in the index. If keys are packed (`PACK_KEYS=1`), `myisamchk` must unpack key blocks first, then re-create indexes and pack the key blocks again. (In this case, re-creating indexes is faster than updating offsets for each index.)

#### 4.6.4.5 Obtaining Table Information with myisamchk

To obtain a description of a MyISAM table or statistics about it, use the commands shown here. The output from these commands is explained later in this section.

- `myisamchk -d tbl_name`

Runs `myisamchk` in “describe mode” to produce a description of your table. If you start the MySQL server with external locking disabled, `myisamchk` may report an error for a table that is updated while it runs. However, because `myisamchk` does not change the table in describe mode, there is no risk of destroying data.

- `myisamchk -dv tbl_name`

Adding `-v` runs `myisamchk` in verbose mode so that it produces more information about the table. Adding `-vv` a second time produces even more information.

- `myisamchk -eis tbl_name`

Shows only the most important information from a table. This operation is slow because it must read the entire table.

- `myisamchk -eiv tbl_name`

This is like `-eis`, but tells you what is being done.

The `tbl_name` argument can be either the name of a MyISAM table or the name of its index file, as described in [Section 4.6.4, “myisamchk — MyISAM Table-Maintenance Utility”](#). Multiple `tbl_name` arguments can be given.

Suppose that a table named `person` has the following structure. (The `MAX_ROWS` table option is included so that in the example output from `myisamchk` shown later, some values are smaller and fit the output format more easily.)

```
CREATE TABLE person
(
    id          INT NOT NULL AUTO_INCREMENT,
    last_name   VARCHAR(20) NOT NULL,
    first_name  VARCHAR(20) NOT NULL,
    birth       DATE,
    death       DATE,
    PRIMARY KEY (id),
    INDEX (last_name, first_name),
    INDEX (birth)
) MAX_ROWS = 1000000 ENGINE=MYISAM;
```

Suppose also that the table has these data and index file sizes:

```
-rw-rw---- 1 mysql  mysql  9347072 Aug 19 11:47 person.MYD
-rw-rw---- 1 mysql  mysql  6066176 Aug 19 11:47 person.MYI
```

Example of `myisamchk -dvvv` output:

```
MyISAM file:          person
Record format:        Packed
Character set:        utf8mb4_0900_ai_ci (255)
File-version:         1
Creation time:        2017-03-30 21:21:30
Status:               checked,analyzed,optimized keys,sorted index pages
Auto increment key:   1 Last value:           306688
Data records:          306688 Deleted blocks:      0
Datafile parts:        306688 Deleted data:       0
Datafile pointer (bytes): 4 Keyfile pointer (bytes): 3
Datafile length:       9347072 Keyfile length:     6066176
Max datafile length:  4294967294 Max keyfile length: 17179868159
Recordlength:          54

table description:
```

Key	Start	Len	Index	Type	Rec/key	Root	Blocksize
1	2	4	unique	long	1		1024
2	6	80	multip.	varchar prefix	0		1024
	87	80		varchar	0		
3	168	3	multip.	uint24 NULL	0		1024
Field	Start	Length	Nullpos	Nullbit	Type		
1	1	1					
2	2	4			no zeros		
3	6	81			varchar		
4	87	81			varchar		
5	168	3	1	1	no zeros		
6	171	3	1	2	no zeros		

Explanations for the types of information `myisamchk` produces are given here. “Keyfile” refers to the index file. “Record” and “row” are synonymous, as are “field” and “column.”

The initial part of the table description contains these values:

- [MyISAM file](#)

Name of the `MyISAM` (index) file.

- [Record format](#)

The format used to store table rows. The preceding examples use `Fixed length`. Other possible values are `Compressed` and `Packed`. (`Packed` corresponds to what `SHOW TABLE STATUS` reports as `Dynamic`.)

- [Character set](#)

The table default character set.

- [File-version](#)

Version of `MyISAM` format. Always 1.

- [Creation time](#)

When the data file was created.

- [Recover time](#)

When the index/data file was last reconstructed.

- [Status](#)

Table status flags. Possible values are `crashed`, `open`, `changed`, `analyzed`, `optimized keys`, and `sorted index pages`.

- [Auto increment key, Last value](#)

The key number associated the table's `AUTO_INCREMENT` column, and the most recently generated value for this column. These fields do not appear if there is no such column.

- [Data records](#)

The number of rows in the table.

- [Deleted blocks](#)

How many deleted blocks still have reserved space. You can optimize your table to minimize this space. See [Section 7.6.4, “MyISAM Table Optimization”](#).

- [Datafile parts](#)

For dynamic-row format, this indicates how many data blocks there are. For an optimized table without fragmented rows, this is the same as [Data records](#).

- [Deleted data](#)

How many bytes of unreclaimed deleted data there are. You can optimize your table to minimize this space. See [Section 7.6.4, “MyISAM Table Optimization”](#).

- [Datafile pointer](#)

The size of the data file pointer, in bytes. It is usually 2, 3, 4, or 5 bytes. Most tables manage with 2 bytes, but this cannot be controlled from MySQL yet. For fixed tables, this is a row address. For dynamic tables, this is a byte address.

- [Keyfile pointer](#)

The size of the index file pointer, in bytes. It is usually 1, 2, or 3 bytes. Most tables manage with 2 bytes, but this is calculated automatically by MySQL. It is always a block address.

- [Max datafile length](#)

How long the table data file can become, in bytes.

- [Max keyfile length](#)

How long the table index file can become, in bytes.

- [Recordlength](#)

How much space each row takes, in bytes.

The [table description](#) part of the output includes a list of all keys in the table. For each key, [myisamchk](#) displays some low-level information:

- [Key](#)

This key's number. This value is shown only for the first column of the key. If this value is missing, the line corresponds to the second or later column of a multiple-column key. For the table shown in the example, there are two [table description](#) lines for the second index. This indicates that it is a multiple-part index with two parts.

- [Start](#)

Where in the row this portion of the index starts.

- [Len](#)

How long this portion of the index is. For packed numbers, this should always be the full length of the column. For strings, it may be shorter than the full length of the indexed column, because you can index a prefix of a string column. The total length of a multiple-part key is the sum of the [Len](#) values for all key parts.

- [Index](#)

Whether a key value can exist multiple times in the index. Possible values are [unique](#) or [multip](#). (multiple).

- [Type](#)

What data type this portion of the index has. This is a [MyISAM](#) data type with the possible values [packed](#), [stripped](#), or [empty](#).

- [Root](#)

Address of the root index block.

- `Blocksize`

The size of each index block. By default this is 1024, but the value may be changed at compile time when MySQL is built from source.

- `Rec/key`

This is a statistical value used by the optimizer. It tells how many rows there are per value for this index. A unique index always has a value of 1. This may be updated after a table is loaded (or greatly changed) with `myisamchk -a`. If this is not updated at all, a default value of 30 is given.

The last part of the output provides information about each column:

- `Field`

The column number.

- `Start`

The byte position of the column within table rows.

- `Length`

The length of the column in bytes.

- `Nullpos, Nullbit`

For columns that can be `NULL`, MyISAM stores `NULL` values as a flag in a byte. Depending on how many nullable columns there are, there can be one or more bytes used for this purpose. The `Nullpos` and `Nullbit` values, if nonempty, indicate which byte and bit contains that flag indicating whether the column is `NULL`.

The position and number of bytes used to store `NULL` flags is shown in the line for field 1. This is why there are six `Field` lines for the `person` table even though it has only five columns.

- `Type`

The data type. The value may contain any of the following descriptors:

- `constant`

All rows have the same value.

- `noendspace`

Do not store endspace.

- `noendspace, not_always`

Do not store endspace and do not do endspace compression for all values.

- `noendspace, noempty`

Do not store endspace. Do not store empty values.

- `table-lookup`

The column was converted to an `ENUM`.

- `zerofill(N)`

The most significant *N* bytes in the value are always 0 and are not stored.

- `no zeros`

Do not store zeros.

- `always zero`

Zero values are stored using one bit.

- `Huff tree`

The number of the Huffman tree associated with the column.

- `Bits`

The number of bits used in the Huffman tree.

The `Huff tree` and `Bits` fields are displayed if the table has been compressed with `myisampack`. See [Section 4.6.6, “myisampack — Generate Compressed, Read-Only MyISAM Tables”](#), for an example of this information.

Example of `myisamchk -eiv` output:

```
Checking MyISAM file: person
Data records: 306688 Deleted blocks: 0
- check file-size
- check record delete-chain
No recordlinks
- check key delete-chain
block_size 1024:
- check index reference
- check data record references index: 1
Key: 1: Keyblocks used: 98% Packed: 0% Max levels: 3
- check data record references index: 2
Key: 2: Keyblocks used: 99% Packed: 97% Max levels: 3
- check data record references index: 3
Key: 3: Keyblocks used: 98% Packed: -14% Max levels: 3
Total: Keyblocks used: 98% Packed: 89%

- check records and index references
*** LOTS OF ROW NUMBERS DELETED ***

Records: 306688 M.recordlength: 25 Packed: 83%
Recordspace used: 97% Empty space: 2% Blocks/Record: 1.00
Record blocks: 306688 Delete blocks: 0
Record data: 7934464 Deleted data: 0
Lost space: 256512 Linkdata: 1156096

User time 43.08, System time 1.68
Maximum resident set size 0, Integral resident set size 0
Non-physical pagefaults 0, Physical pagefaults 0, Swaps 0
Blocks in 0 out 7, Messages in 0 out 0, Signals 0
Voluntary context switches 0, Involuntary context switches 0
Maximum memory usage: 1046926 bytes (1023k)
```

`myisamchk -eiv` output includes the following information:

- `Data records`

The number of rows in the table.

- `Deleted blocks`

How many deleted blocks still have reserved space. You can optimize your table to minimize this space. See [Section 7.6.4, “MyISAM Table Optimization”](#).

- **Key**

The key number.

- **Keyblocks used**

What percentage of the keyblocks are used. When a table has just been reorganized with `myisamchk`, the values are very high (very near theoretical maximum).

- **Packed**

MySQL tries to pack key values that have a common suffix. This can only be used for indexes on `CHAR` and `VARCHAR` columns. For long indexed strings that have similar leftmost parts, this can significantly reduce the space used. In the preceding example, the second key is 40 bytes long and a 97% reduction in space is achieved.

- **Max levels**

How deep the B-tree for this key is. Large tables with long key values get high values.

- **Records**

How many rows are in the table.

- **M.recordlength**

The average row length. This is the exact row length for tables with fixed-length rows, because all rows have the same length.

- **Packed**

MySQL strips spaces from the end of strings. The **Packed** value indicates the percentage of savings achieved by doing this.

- **Recordspace used**

What percentage of the data file is used.

- **Empty space**

What percentage of the data file is unused.

- **Blocks/Record**

Average number of blocks per row (that is, how many links a fragmented row is composed of). This is always 1.0 for fixed-format tables. This value should stay as close to 1.0 as possible. If it gets too large, you can reorganize the table. See [Section 7.6.4, “MyISAM Table Optimization”](#).

- **Recordblocks**

How many blocks (links) are used. For fixed-format tables, this is the same as the number of rows.

- **Deleteblocks**

How many blocks (links) are deleted.

- **Recorddata**

How many bytes in the data file are used.

- **Deleted data**

How many bytes in the data file are deleted (unused).

- [Lost space](#)

If a row is updated to a shorter length, some space is lost. This is the sum of all such losses, in bytes.

- [Linkdata](#)

When the dynamic table format is used, row fragments are linked with pointers (4 to 7 bytes each). [Linkdata](#) is the sum of the amount of storage used by all such pointers.

#### 4.6.4.6 myisamchk Memory Usage

Memory allocation is important when you run [myisamchk](#). [myisamchk](#) uses no more memory than its memory-related variables are set to. If you are going to use [myisamchk](#) on very large tables, you should first decide how much memory you want it to use. The default is to use only about 3MB to perform repairs. By using larger values, you can get [myisamchk](#) to operate faster. For example, if you have more than 512MB RAM available, you could use options such as these (in addition to any other options you might specify):

```
myisamchk --myisam_sort_buffer_size=256M \
           --key_buffer_size=512M \
           --read_buffer_size=64M \
           --write_buffer_size=64M ...
```

Using `--myisam_sort_buffer_size=16M` is probably enough for most cases.

Be aware that [myisamchk](#) uses temporary files in [TMPDIR](#). If [TMPDIR](#) points to a memory file system, out of memory errors can easily occur. If this happens, run [myisamchk](#) with the `--tmpdir=dir_name` option to specify a directory located on a file system that has more space.

When performing repair operations, [myisamchk](#) also needs a lot of disk space:

- Twice the size of the data file (the original file and a copy). This space is not needed if you do a repair with `--quick`; in this case, only the index file is re-created. *This space must be available on the same file system as the original data file*, as the copy is created in the same directory as the original.
- Space for the new index file that replaces the old one. The old index file is truncated at the start of the repair operation, so you usually ignore this space. This space must be available on the same file system as the original data file.
- When using `--recover` or `--sort-recover` (but not when using `--safe-recover`), you need space on disk for sorting. This space is allocated in the temporary directory (specified by [TMPDIR](#) or `--tmpdir=dir_name`). The following formula yields the amount of space required:

```
(largest_key + row_pointer_length) * number_of_rows * 2
```

You can check the length of the keys and the [row\\_pointer\\_length](#) with [myisamchk -dv tbl\\_name](#) (see [Section 4.6.4.5, “Obtaining Table Information with myisamchk”](#)). The [row\\_pointer\\_length](#) and [number\\_of\\_rows](#) values are the [Datafile pointer](#) and [Data records](#) values in the table description. To determine the [largest\\_key](#) value, check the [Key](#) lines in the table description. The [Len](#) column indicates the number of bytes for each key part. For a multiple-column index, the key size is the sum of the [Len](#) values for all key parts.

If you have a problem with disk space during repair, you can try `--safe-recover` instead of `--recover`.

#### 4.6.5 myisamlog — Display MyISAM Log File Contents

[myisamlog](#) processes the contents of a [MyISAM](#) log file. To create such a file, start the server with a `--log-isam=log_file` option.

Invoke `myisamlog` like this:

```
myisamlog [options] [file_name [tbl_name] ...]
```

The default operation is update (`-u`). If a recovery is done (`-r`), all writes and possibly updates and deletes are done and errors are only counted. The default log file name is `myisam.log` if no `log_file` argument is given. If tables are named on the command line, only those tables are updated.

`myisamlog` supports the following options:

- `-?, -I`

Display a help message and exit.

- `-c N`

Execute only `N` commands.

- `-f N`

Specify the maximum number of open files.

- `-F filepath/`

Specify the file path with a trailing slash.

- `-i`

Display extra information before exiting.

- `-o offset`

Specify the starting offset.

- `-p N`

Remove `N` components from path.

- `-r`

Perform a recovery operation.

- `-R record_pos_file record_pos`

Specify record position file and record position.

- `-u`

Perform an update operation.

- `-v`

Verbose mode. Print more output about what the program does. This option can be given multiple times to produce more and more output.

- `-w write_file`

Specify the write file.

- `-V`

Display version information.

## 4.6.6 myisampack — Generate Compressed, Read-Only MyISAM Tables

The `myisampack` utility compresses MyISAM tables. `myisampack` works by compressing each column in the table separately. Usually, `myisampack` packs the data file 40% to 70%.

When the table is used later, the server reads into memory the information needed to decompress columns. This results in much better performance when accessing individual rows, because you only have to uncompress exactly one row.

MySQL uses `mmap()` when possible to perform memory mapping on compressed tables. If `mmap()` does not work, MySQL falls back to normal read/write file operations.

Please note the following:

- If the `mysqld` server was invoked with external locking disabled, it is not a good idea to invoke `myisampack` if the table might be updated by the server during the packing process. It is safest to compress tables with the server stopped.
- After packing a table, it becomes read only. This is generally intended (such as when accessing packed tables on a CD).
- `myisampack` does not support partitioned tables.

Invoke `myisampack` like this:

```
myisampack [options] file_name ...
```

Each file name argument should be the name of an index (`.MYI`) file. If you are not in the database directory, you should specify the path name to the file. It is permissible to omit the `.MYI` extension.

After you compress a table with `myisampack`, use `myisamchk -rq` to rebuild its indexes.

[Section 4.6.4, “myisamchk — MyISAM Table-Maintenance Utility”](#).

`myisampack` supports the following options. It also reads option files and supports the options for processing them described at [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--help, -?`

Display a help message and exit.

- `--backup, -b`

Make a backup of each table's data file using the name `tbl_name.OLD`.

- `--character-sets-dir=dir_name`

The directory where character sets are installed. See [Section 10.15, “Character Set Configuration”](#).

- `--debug[=debug_options], -# [debug_options]`

Write a debugging log. A typical `debug_options` string is `d:t:o,file_name`. The default is `d:t:o`.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `--force, -f`

Produce a packed table even if it becomes larger than the original or if the intermediate file from an earlier invocation of `myisampack` exists. (`myisampack` creates an intermediate file named `tbl_name.TMD` in the database directory while it compresses the table. If you kill `myisampack`, the `.TMD` file might not be deleted.) Normally, `myisampack` exits with an error if it finds that `tbl_name.TMD` exists. With `--force`, `myisampack` packs the table anyway.

- `--join=big_tbl_name, -j big_tbl_name`

Join all tables named on the command line into a single packed table `big_tbl_name`. All tables that are to be combined *must* have identical structure (same column names and types, same indexes, and so forth).

`big_tbl_name` must not exist prior to the join operation. All source tables named on the command line to be merged into `big_tbl_name` must exist. The source tables are read for the join operation but not modified.

- `--silent, -s`

Silent mode. Write output only when errors occur.

- `--test, -t`

Do not actually pack the table, just test packing it.

- `--tmpdir=dir_name, -T dir_name`

Use the named directory as the location where `myisampack` creates temporary files.

- `--verbose, -v`

Verbose mode. Write information about the progress of the packing operation and its result.

- `--version, -V`

Display version information and exit.

- `--wait, -w`

Wait and retry if the table is in use. If the `mysqld` server was invoked with external locking disabled, it is not a good idea to invoke `myisampack` if the table might be updated by the server during the packing process.

The following sequence of commands illustrates a typical table compression session:

```
$> ls -l station.*  
-rw-rw-r-- 1 jones my          994128 Apr 17 19:00 station.MYD  
-rw-rw-r-- 1 jones my          53248 Apr 17 19:00 station.MYI  
  
$> myisamchk -dvv station  
  
MyISAM file:      station  
Isam-version:    2  
Creation time: 1996-03-13 10:08:58  
Recover time:  1997-02-02  3:06:43  
Data records:        1192 Deleted blocks:          0  
Datafile parts:       1192 Deleted data:           0  
Datafile pointer (bytes):   2 Keyfile pointer (bytes):  2  
Max datafile length: 54657023 Max keyfile length: 33554431  
Recordlength:        834  
Record format: Fixed length  
  
table description:  
Key Start Len Index Type          Root Blocksize Rec/key  
1   2     4   unique  unsigned long    1024    1024      1  
2   32    30  multip. text       10240   1024      1  
  
Field Start Length Type  
1     1      1  
2     2      4  
3     6      4  
4    10      1  
5    11     20  
6    31      1  
7    32     30
```

```
8      62    35
9      97    35
10     132   35
11     167    4
12     171   16
13     187   35
14     222    4
15     226   16
16     242   20
17     262   20
18     282   20
19     302   30
20     332    4
21     336    4
22     340    1
23     341    8
24     349    8
25     357    8
26     365    2
27     367    2
28     369    4
29     373    4
30     377    1
31     378    2
32     380    8
33     388    4
34     392    4
35     396    4
36     400    4
37     404    1
38     405    4
39     409    4
40     413    4
41     417    4
42     421    4
43     425    4
44     429   20
45     449   30
46     479    1
47     480    1
48     481   79
49     560   79
50     639   79
51     718   79
52     797    8
53     805    1
54     806    1
55     807   20
56     827    4
57     831    4

$> myisampack station.MYI
Compressing station.MYI: (1192 records)
- Calculating statistics

normal:      20  empty-space:    16  empty-zero:      12  empty-fill:    11
pre-space:    0   end-space:     12  table-lookups:    5   zero:        7
Original trees:  57  After join: 17
- Compressing file
87.14%
Remember to run myisamchk -rq on compressed tables

$> myisamchk -rq station
- check record delete-chain
- recovering (with sort) MyISAM-table 'station'
Data records: 1192
- Fixing index 1
- Fixing index 2

$> mysqladmin -uroot flush-tables
$> ls -l station.*
```

```

-rw-rw-r-- 1 jones my          127874 Apr 17 19:00 station.MYD
-rw-rw-r-- 1 jones my          55296 Apr 17 19:04 station.MYI

$> myisamchk -dvv station

MyISAM file:      station
Isam-version: 2
Creation time: 1996-03-13 10:08:58
Recover time: 1997-04-17 19:04:26
Data records:      1192 Deleted blocks:          0
Datafile parts:    1192 Deleted data:           0
Datafile pointer (bytes):   3 Keyfile pointer (bytes):   1
Max datafile length: 16777215 Max keyfile length: 131071
Recordlength:     834
Record format: Compressed

table description:
Key Start Len Index Type          Root Blocksize Rec/key
1   2      4  unique unsigned long 10240 1024        1
2   32     30 multip. text       54272 1024        1

Field Start Length Type          Huff tree Bits
1     1      1 constant          1      0
2     2      4 zerofill(1)       2      9
3     6      4 no zeros, zerofill(1) 2      9
4    10      1
5    11     20 table-lookup      4      0
6    31      1
7    32     30 no endspace, not_always 5      9
8    62     35 no endspace, not_always, no empty 6      9
9    97     35 no empty          7      9
10   132    35 no endspace, not_always, no empty 6      9
11   167    4  zerofill(1)       2      9
12   171    16 no endspace, not_always, no empty 5      9
13   187    35 no endspace, not_always, no empty 6      9
14   222    4  zerofill(1)       2      9
15   226    16 no endspace, not_always, no empty 5      9
16   242    20 no endspace, not_always       8      9
17   262    20 no endspace, no empty          8      9
18   282    20 no endspace, no empty          5      9
19   302    30 no endspace, no empty          6      9
20   332    4  always zero         2      9
21   336    4  always zero         2      9
22   340    1
23   341    8  table-lookup       9      0
24   349    8  table-lookup       10     0
25   357    8  always zero         2      9
26   365    2
27   367    2  no zeros, zerofill(1) 2      9
28   369    4  no zeros, zerofill(1) 2      9
29   373    4  table-lookup       11     0
30   377    1
31   378    2  no zeros, zerofill(1) 2      9
32   380    8  no zeros          2      9
33   388    4  always zero         2      9
34   392    4  table-lookup       12     0
35   396    4  no zeros, zerofill(1) 13     9
36   400    4  no zeros, zerofill(1) 2      9
37   404    1
38   405    4  no zeros          2      9
39   409    4  always zero         2      9
40   413    4  no zeros          2      9
41   417    4  always zero         2      9
42   421    4  no zeros          2      9
43   425    4  always zero         2      9
44   429    20 no empty          3      9
45   449    30 no empty          3      9
46   479    1
47   480    1
48   481    79 no endspace, no empty 15     9
49   560    79 no empty          2      9
50   639    79 no empty          2      9

```

51	718	79	noendspace	16	9
52	797	8	noempty	2	9
53	805	1		17	1
54	806	1		3	9
55	807	20	noempty	3	9
56	827	4	nozeros, zerofill(2)	2	9
57	831	4	nozeros, zerofill(1)	2	9

`myisampack` displays the following kinds of information:

- `normal`

The number of columns for which no extra packing is used.

- `empty-space`

The number of columns containing values that are only spaces. These occupy one bit.

- `empty-zero`

The number of columns containing values that are only binary zeros. These occupy one bit.

- `empty-fill`

The number of integer columns that do not occupy the full byte range of their type. These are changed to a smaller type. For example, a `BIGINT` column (eight bytes) can be stored as a `TINYINT` column (one byte) if all its values are in the range from `-128` to `127`.

- `pre-space`

The number of decimal columns that are stored with leading spaces. In this case, each value contains a count for the number of leading spaces.

- `end-space`

The number of columns that have a lot of trailing spaces. In this case, each value contains a count for the number of trailing spaces.

- `table-lookup`

The column had only a small number of different values, which were converted to an `ENUM` before Huffman compression.

- `zero`

The number of columns for which all values are zero.

- `Original trees`

The initial number of Huffman trees.

- `After join`

The number of distinct Huffman trees left after joining trees to save some header space.

After a table has been compressed, the `Field` lines displayed by `myisamchk -dvv` include additional information about each column:

- `Type`

The data type. The value may contain any of the following descriptors:

- `constant`

All rows have the same value.

- `noendspace`

Do not store endspace.
- `noendspace, notalways`

Do not store endspace and do not do endspace compression for all values.
- `noendspace, noempty`

Do not store endspace. Do not store empty values.
- `table-lookup`

The column was converted to an [ENUM](#).
- `zerofill(N)`

The most significant `N` bytes in the value are always 0 and are not stored.
- `nozeros`

Do not store zeros.
- `alwayszero`

Zero values are stored using one bit.
- `Huff tree`

The number of the Huffman tree associated with the column.
- `Bits`

The number of bits used in the Huffman tree.

After you run `myisampack`, use `myisamchk` to re-create any indexes. At this time, you can also sort the index blocks and create statistics needed for the MySQL optimizer to work more efficiently:

```
myisamchk -rq --sort-index --analyze tbl_name.MYI
```

After you have installed the packed table into the MySQL database directory, you should execute `mysqladmin flush-tables` to force `mysqld` to start using the new table.

To unpack a packed table, use the `--unpack` option to `myisamchk`.

## 4.6.7 mysql\_config\_editor — MySQL Configuration Utility

The `mysql_config_editor` utility enables you to store authentication credentials in an obfuscated login path file named `.mylogin.cnf`. The file location is the `%APPDATA%\MySQL` directory on Windows and the current user's home directory on non-Windows systems. The file can be read later by MySQL client programs to obtain authentication credentials for connecting to MySQL Server.

The unobfuscated format of the `.mylogin.cnf` login path file consists of option groups, similar to other option files. Each option group in `.mylogin.cnf` is called a “login path,” which is a group that permits only certain options: `host`, `user`, `password`, `port` and `socket`. Think of a login path option group as a set of options that specify which MySQL server to connect to and which account to authenticate as. Here is an unobfuscated example:

```
[client]
user = mydefaultname
password = mydefaultpass
host = 127.0.0.1
```

```
[mypath]
user = myothername
password = myotherpass
host = localhost
```

When you invoke a client program to connect to the server, the client uses `.mylogin.cnf` in conjunction with other option files. Its precedence is higher than other option files, but less than options specified explicitly on the client command line. For information about the order in which option files are used, see [Section 4.2.2.2, “Using Option Files”](#).

To specify an alternate login path file name, set the `MYSQL_TEST_LOGIN_FILE` environment variable. This variable is recognized by `mysql_config_editor`, by standard MySQL clients (`mysql`, `mysqldadmin`, and so forth), and by the `mysql-test-run.pl` testing utility.

Programs use groups in the login path file as follows:

- `mysql_config_editor` operates on the `client` login path by default if you specify no `--login-path=name` option to indicate explicitly which login path to use.
- Without a `--login-path` option, client programs read the same option groups from the login path file that they read from other option files. Consider this command:

```
mysql
```

By default, the `mysql` client reads the `[client]` and `[mysql]` groups from other option files, so it reads them from the login path file as well.

- With a `--login-path` option, client programs additionally read the named login path from the login path file. The option groups read from other option files remain the same. Consider this command:

```
mysql --login-path=mypath
```

The `mysql` client reads `[client]` and `[mysql]` from other option files, and `[client]`, `[mysql]`, and `[mypath]` from the login path file.

- Client programs read the login path file even when the `--no-defaults` option is used. This permits passwords to be specified in a safer way than on the command line even if `--no-defaults` is present.

`mysql_config_editor` obfuscates the `.mylogin.cnf` file so it cannot be read as cleartext, and its contents when unobfuscated by client programs are used only in memory. In this way, passwords can be stored in a file in non-cleartext format and used later without ever needing to be exposed on the command line or in an environment variable. `mysql_config_editor` provides a `print` command for displaying the login path file contents, but even in this case, password values are masked so as never to appear in a way that other users can see them.

The obfuscation used by `mysql_config_editor` prevents passwords from appearing in `.mylogin.cnf` as cleartext and provides a measure of security by preventing inadvertent password exposure. For example, if you display a regular unobfuscated `my.cnf` option file on the screen, any passwords it contains are visible for anyone to see. With `.mylogin.cnf`, that is not true, but the obfuscation used is not likely to deter a determined attacker and you should not consider it unbreakable. A user who can gain system administration privileges on your machine to access your files could unobfuscate the `.mylogin.cnf` file with some effort.

The login path file must be readable and writable to the current user, and inaccessible to other users. Otherwise, `mysql_config_editor` ignores it, and client programs do not use it, either.

Invoke `mysql_config_editor` like this:

```
mysql_config_editor [program_options] command [command_options]
```

If the login path file does not exist, `mysql_config_editor` creates it.

Command arguments are given as follows:

- *program\_options* consists of general `mysql_config_editor` options.
- *command* indicates what action to perform on the `.mylogin.cnf` login path file. For example, `set` writes a login path to the file, `remove` removes a login path, and `print` displays login path contents.
- *command\_options* indicates any additional options specific to the command, such as the login path name and the values to use in the login path.

The position of the command name within the set of program arguments is significant. For example, these command lines have the same arguments, but produce different results:

```
mysql_config_editor --help set
mysql_config_editor set --help
```

The first command line displays a general `mysql_config_editor` help message, and ignores the `set` command. The second command line displays a help message specific to the `set` command.

Suppose that you want to establish a `client` login path that defines your default connection parameters, and an additional login path named `remote` for connecting to the MySQL server the host `remote.example.com`. You want to log in as follows:

- By default, to the local server with a user name and password of `localuser` and `localpass`
- To the remote server with a user name and password of `remoteuser` and `remotepass`

To set up the login paths in the `.mylogin.cnf` file, use the following `set` commands. Enter each command on a single line, and enter the appropriate passwords when prompted:

```
$> mysql_config_editor set --login-path=client
      --host=localhost --user=localuser --password
Enter password: enter password "localpass" here
$> mysql_config_editor set --login-path=remote
      --host=remote.example.com --user=remoteuser --password
Enter password: enter password "remotepass" here
```

`mysql_config_editor` uses the `client` login path by default, so the `--login-path=client` option can be omitted from the first command without changing its effect.

To see what `mysql_config_editor` writes to the `.mylogin.cnf` file, use the `print` command:

```
$> mysql_config_editor print --all
[client]
user = localuser
password = *****
host = localhost
[remote]
user = remoteuser
password = *****
host = remote.example.com
```

The `print` command displays each login path as a set of lines beginning with a group header indicating the login path name in square brackets, followed by the option values for the login path. Password values are masked and do not appear as cleartext.

If you do not specify `--all` to display all login paths or `--login-path=name` to display a named login path, the `print` command displays the `client` login path by default, if there is one.

As shown by the preceding example, the login path file can contain multiple login paths. In this way, `mysql_config_editor` makes it easy to set up multiple “personalities” for connecting to different MySQL servers, or for connecting to a given server using different accounts. Any of these can be selected by name later using the `--login-path` option when you invoke a client program. For example, to connect to the remote server, use this command:

```
mysql --login-path=remote
```

Here, `mysql` reads the `[client]` and `[mysql]` option groups from other option files, and the `[client]`, `[mysql]`, and `[remote]` groups from the login path file.

To connect to the local server, use this command:

```
mysql --login-path=client
```

Because `mysql` reads the `client` and `mysql` login paths by default, the `--login-path` option does not add anything in this case. That command is equivalent to this one:

```
mysql
```

Options read from the login path file take precedence over options read from other option files. Options read from login path groups appearing later in the login path file take precedence over options read from groups appearing earlier in the file.

`mysql_config_editor` adds login paths to the login path file in the order you create them, so you should create more general login paths first and more specific paths later. If you need to move a login path within the file, you can remove it, then recreate it to add it to the end. For example, a `client` login path is more general because it is read by all client programs, whereas a `mysqldump` login path is read only by `mysqldump`. Options specified later override options specified earlier, so putting the login paths in the order `client`, `mysqldump` enables `mysqldump`-specific options to override `client` options.

When you use the `set` command with `mysql_config_editor` to create a login path, you need not specify all possible option values (host name, user name, password, port, socket). Only those values given are written to the path. Any missing values required later can be specified when you invoke a client path to connect to the MySQL server, either in other option files or on the command line. Any options specified on the command line override those specified in the login path file or other option files. For example, if the credentials in the `remote` login path also apply for the host `remote2.example.com`, connect to the server on that host like this:

```
mysql --login-path=remote --host=remote2.example.com
```

## mysql\_config\_editor General Options

`mysql_config_editor` supports the following general options, which may be used preceding any command named on the command line. For descriptions of command-specific options, see [mysql\\_config\\_editor Commands and Command-Specific Options](#).

**Table 4.20 mysql\_config\_editor General Options**

Option Name	Description
<code>--debug</code>	Write debugging log
<code>--help</code>	Display help message and exit
<code>--verbose</code>	Verbose mode
<code>--version</code>	Display version information and exit

- `--help`, `-?`

Display a general help message and exit.

To see a command-specific help message, invoke `mysql_config_editor` as follows, where `command` is a command other than `help`:

```
mysql_config_editor command --help
```

- `--debug[=debug_options]`, `-# debug_options`

Write a debugging log. A typical `debug_options` string is `d:t:o,file_name`. The default is `d:t:o,/tmp/mysql_config_editor.trace`.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `--verbose, -v`

Verbose mode. Print more information about what the program does. This option may be helpful in diagnosing problems if an operation does not have the effect you expect.

- `--version, -V`

Display version information and exit.

## mysql\_config\_editor Commands and Command-Specific Options

This section describes the permitted `mysql_config_editor` commands, and, for each one, the command-specific options permitted following the command name on the command line.

In addition, `mysql_config_editor` supports general options that can be used preceding any command. For descriptions of these options, see [mysql\\_config\\_editor General Options](#).

`mysql_config_editor` supports these commands:

- `help`

Display a general help message and exit. This command takes no following options.

To see a command-specific help message, invoke `mysql_config_editor` as follows, where `command` is a command other than `help`:

```
mysql_config_editor command --help
```

- `print [options]`

Print the contents of the login path file in unobfuscated form, with the exception that passwords are displayed as `*****`.

The default login path name is `client` if no login path is named. If both `--all` and `--login-path` are given, `--all` takes precedence.

The `print` command permits these options following the command name:

- `--help, -?`

Display a help message for the `print` command and exit.

To see a general help message, use `mysql_config_editor --help`.

- `--all`

Print the contents of all login paths in the login path file.

- `--login-path=name, -G name`

Print the contents of the named login path.

- `remove [options]`

Remove a login path from the login path file, or modify a login path by removing options from it.

This command removes from the login path only such options as are specified with the `--host`, `--password`, `--port`, `--socket`, and `--user` options. If none of those options are given, `remove` removes the entire login path. For example, this command removes only the `user` option from the `mypath` login path rather than the entire `mypath` login path:

```
mysql_config_editor remove --login-path=mypath --user
```

This command removes the entire `mypath` login path:

```
mysql_config_editor remove --login-path=mypath
```

The `remove` command permits these options following the command name:

- `--help, -?`

Display a help message for the `remove` command and exit.

To see a general help message, use `mysql_config_editor --help`.

- `--host, -h`

Remove the host name from the login path.

- `--login-path=name, -G name`

The login path to remove or modify. The default login path name is `client` if this option is not given.

- `--password, -p`

Remove the password from the login path.

- `--port, -P`

Remove the TCP/IP port number from the login path.

- `--socket, -S`

Remove the Unix socket file name from the login path.

- `--user, -u`

Remove the user name from the login path.

- `--warn, -w`

Warn and prompt the user for confirmation if the command attempts to remove the default login path (`client`) and `--login-path=client` was not specified. This option is enabled by default; use `--skip-warn` to disable it.

- `reset [options]`

Empty the contents of the login path file.

The `reset` command permits these options following the command name:

- `--help, -?`

Display a help message for the `reset` command and exit.

To see a general help message, use `mysql_config_editor --help`.

- `set [options]`

Write a login path to the login path file.

This command writes to the login path only such options as are specified with the `--host`, `--password`, `--port`, `--socket`, and `--user` options. If none of those options are given, `mysql_config_editor` writes the login path as an empty group.

The `set` command permits these options following the command name:

- `--help, -?`

Display a help message for the `set` command and exit.

To see a general help message, use `mysql_config_editor --help`.

- `--host=host_name, -h host_name`

The host name to write to the login path.

- `--login-path=name, -G name`

The login path to create. The default login path name is `client` if this option is not given.

- `--password, -p`

Prompt for a password to write to the login path. After `mysql_config_editor` displays the prompt, type the password and press Enter. To prevent other users from seeing the password, `mysql_config_editor` does not echo it.

To specify an empty password, press Enter at the password prompt. The resulting login path written to the login path file includes a line like this:

- ```
password =  
• --port=port_num, -P port_num
```

The TCP/IP port number to write to the login path.

- `--socket=file_name, -S file_name`

The Unix socket file name to write to the login path.

- `--user=user_name, -u user_name`

The user name to write to the login path.

- `--warn, -w`

Warn and prompt the user for confirmation if the command attempts to overwrite an existing login path. This option is enabled by default; use `--skip-warn` to disable it.

## 4.6.8 mysql\_migrate\_keyring — Keyring Key Migration Utility

The `mysql_migrate_keyring` utility migrates keys between one keyring component and another. It supports offline and online migrations.

Invoke `mysql_migrate_keyring` like this (enter the command on a single line):

```
mysql_migrate_keyring  
--component-dir=dir_name  
--source-keyring=name  
--destination-keyring=name
```

**[*other options*]**

For information about key migrations and instructions describing how to perform them using `mysql_migrate_keyring` and other methods, see [Section 6.4.4.14, “Migrating Keys Between Keyring Keystores”](#).

`mysql_migrate_keyring` supports the following options, which can be specified on the command line or in the [`mysql_migrate_keyring`] group of an option file. For information about option files used by MySQL programs, see [Section 4.2.2.2, “Using Option Files”](#).

**Table 4.21 mysql\_migrate\_keyring Options**

| Option Name                                          | Description                                                                 | Introduced |
|------------------------------------------------------|-----------------------------------------------------------------------------|------------|
| <code>--component-dir</code>                         | Directory for keyring components                                            |            |
| <code>--defaults-extra-file</code>                   | Read named option file in addition to usual option files                    |            |
| <code>--defaults-file</code>                         | Read only named option file                                                 |            |
| <code>--defaults-group-suffix</code>                 | Option group suffix value                                                   |            |
| <code>--destination-keyring</code>                   | Destination keyring component name                                          |            |
| <code>--destination-keyring-configuration-dir</code> | Destination keyring component configuration directory                       |            |
| <code>--get-server-public-key</code>                 | Request RSA public key from server                                          |            |
| <code>--help</code>                                  | Display help message and exit                                               |            |
| <code>--host</code>                                  | Host on which MySQL server is located                                       |            |
| <code>--login-path</code>                            | Read login path options from .mylogin.cnf                                   |            |
| <code>--no-defaults</code>                           | Read no option files                                                        |            |
| <code>--online-migration</code>                      | Migration source is an active server                                        |            |
| <code>--password</code>                              | Password to use when connecting to server                                   |            |
| <code>--port</code>                                  | TCP/IP port number for connection                                           |            |
| <code>--print-defaults</code>                        | Print default options                                                       |            |
| <code>--server-public-key-path</code>                | Path name to file containing RSA public key                                 |            |
| <code>--socket</code>                                | Unix socket file or Windows named pipe to use                               |            |
| <code>--source-keyring</code>                        | Source keyring component name                                               |            |
| <code>--source-keyring-configuration-dir</code>      | Source keyring component configuration directory                            |            |
| <code>--ssl-ca</code>                                | File that contains list of trusted SSL Certificate Authorities              |            |
| <code>--ssl-capath</code>                            | Directory that contains trusted SSL Certificate Authority certificate files |            |
| <code>--ssl-cert</code>                              | File that contains X.509 certificate                                        |            |

| Option Name                                 | Description                                                | Introduced |
|---------------------------------------------|------------------------------------------------------------|------------|
| --ssl-cipher                                | Permissible ciphers for connection encryption              |            |
| --ssl-crl                                   | File that contains certificate revocation lists            |            |
| --ssl-crlpath                               | Directory that contains certificate revocation-list files  |            |
| --ssl-fips-mode                             | Whether to enable FIPS mode on client side                 |            |
| --ssl-key                                   | File that contains X.509 key                               |            |
| --ssl-mode                                  | Desired security state of connection to server             |            |
| --ssl-session-data                          | File that contains SSL session data                        | 8.0.29     |
| --ssl-session-data-continue-on-failed-reuse | Whether to establish connections if session reuse fails    | 8.0.29     |
| --tls-ciphersuites                          | Permissible TLSv1.3 ciphersuites for encrypted connections |            |
| --tls-version                               | Permissible TLS protocols for encrypted connections        |            |
| --user                                      | MySQL user name to use when connecting to server           |            |
| --verbose                                   | Verbose mode                                               |            |
| --version                                   | Display version information and exit                       |            |

- `--help, -h`

Display a help message and exit.

- `--component-dir=dir_name`

The directory where keyring components are located. This is typically the value of the `plugin_dir` system variable for the local MySQL server.



#### Note

`--component-dir`, `--source-keyring`, and `--destination-keyring` are mandatory for all keyring migration operations performed by `mysql_migrate_keyring`. In addition, the source and destination components must differ, and both components must be properly configured so that `mysql_migrate_keyring` can load and use them.

- `--defaults-extra-file=file_name`

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.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--defaults-file=file_name`

Use 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`, client programs read `.mylogin.cnf`.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--defaults-group-suffix=str`

Read not only the usual option groups, but also groups with the usual names and a suffix of `str`. For example, `mysql_migrate_keyring` normally reads the `[mysql_migrate_keyring]` group. If this option is given as `--defaults-group-suffix=_other`, `mysql_migrate_keyring` also reads the `[mysql_migrate_keyring_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”](#).

- `--destination-keyring=name`

The destination keyring component for key migration. The format and interpretation of the option value is the same as described for the `--source-keyring` option.



#### Note

`--component-dir`, `--source-keyring`, and `--destination-keyring` are mandatory for all keyring migration operations performed by `mysql_migrate_keyring`. In addition, the source and destination components must differ, and both components must be properly configured so that `mysql_migrate_keyring` can load and use them.

- `--destination-keyring-configuration-dir=dir_name`

This option applies only if the destination keyring component global configuration file contains `"read_local_config": true`, indicating that component configuration is contained in the local configuration file. The option value specifies the directory containing that local file.

- `--get-server-public-key`

Request from the server the public key required for RSA key pair-based password exchange. This option applies to clients that authenticate with the `caching_sha2_password` authentication plugin. For that plugin, the server does not send the public key unless requested. This option is ignored for accounts that do not authenticate with that plugin. It is also ignored if RSA-based password exchange is not used, as is the case when the client connects to the server using a secure connection.

If `--server-public-key-path=file_name` is given and specifies a valid public key file, it takes precedence over `--get-server-public-key`.

For information about the `caching_sha2_password` plugin, see [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](#).

- `--host=host_name`, `-h host_name`

The host location of the running server that is currently using one of the key migration keystores. Migration always occurs on the local host, so the option always specifies a value for connecting to a local server, such as `localhost`, `127.0.0.1`, `::1`, or the local host IP address or host name.

- `--login-path=name`

Read options from the named login path in the `.mylogin.cnf` login path file. A “login path” is an option group containing options that specify which MySQL server to connect to and which account to authenticate as. To create or modify a login path file, use the `mysql_config_editor` utility. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--no-defaults`

Do not read any option files. If program startup fails due to reading unknown options from an option file, `--no-defaults` can be used to prevent them from being read.

The exception is that the `.mylogin.cnf` file is read in all cases, if it exists. This permits passwords to be specified in a safer way than on the command line even when `--no-defaults` is used. To create `.mylogin.cnf`, use the `mysql_config_editor` utility. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--online-migration`

This option is mandatory when a running server is using the keyring. It tells `mysql_migrate_keyring` to perform an online key migration. The option has these effects:

- `mysql_migrate_keyring` connects to the server using any connection options specified; these options are otherwise ignored.
- After `mysql_migrate_keyring` connects to the server, it tells the server to pause keyring operations. When key copying is complete, `mysql_migrate_keyring` tells the server it can resume keyring operations before disconnecting.
- `--password[=password], -p[password]`

The password of the MySQL account used for connecting to the running server that is currently using one of the key migration keystores. The password value is optional. If not given, `mysql_migrate_keyring` prompts for one. If given, there must be *no space* between `--password=` or `-p` and the password following it. If no password option is specified, the default is to send no password.

Specifying a password on the command line should be considered insecure. To avoid giving the password on the command line, use an option file. See [Section 6.1.2.1, “End-User Guidelines for Password Security”](#).

To explicitly specify that there is no password and that `mysql_migrate_keyring` should not prompt for one, use the `--skip-password` option.

- `--port=port_num, -P port_num`

For TCP/IP connections, the port number for connecting to the running server that is currently using one of the key migration keystores.

- `--print-defaults`

Print the program name and all options that it gets from option files.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--server-public-key-path=file_name`

The path name to a file in PEM format containing a client-side copy of the public key required by the server for RSA key pair-based password exchange. This option applies to clients that authenticate with the `sha256_password` or `caching_sha2_password` authentication plugin. This option is ignored for accounts that do not authenticate with one of those plugins. It is also ignored if RSA-based password exchange is not used, as is the case when the client connects to the server using a secure connection.

If `--server-public-key-path=file_name` is given and specifies a valid public key file, it takes precedence over `--get-server-public-key`.

For `sha256_password`, this option applies only if MySQL was built using OpenSSL.

For information about the `sha256_password` and `caching_sha2_password` plugins, see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](#), and [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](#).

- `--socket=path, -S path`

For Unix socket file or Windows named pipe connections, the socket file or named pipe for connecting to the running server that is currently using one of the key migration keystores.

On Windows, this option applies only if the server was started with the `named_pipe` system variable enabled to support named-pipe connections. In addition, the user making the connection must be a member of the Windows group specified by the `named_pipe_full_access_group` system variable.

- `--source-keyring=name`

The source keyring component for key migration. This is the component library file name specified without any platform-specific extension such as `.so` or `.dll`. For example, to use the component for which the library file is `component_keyring_file.so`, specify the option as `--source-keyring=component_keyring_file`.



#### Note

`--component-dir`, `--source-keyring`, and `--destination-keyring` are mandatory for all keyring migration operations performed by `mysql_migrate_keyring`. In addition, the source and destination components must differ, and both components must be properly configured so that `mysql_migrate_keyring` can load and use them.

- `--source-keyring-configuration-dir=dir_name`

This option applies only if the source keyring component global configuration file contains `"read_local_config": true`, indicating that component configuration is contained in the local configuration file. The option value specifies the directory containing that local file.

- `--ssl*`

Options that begin with `--ssl` specify whether to connect to the server using encryption and indicate where to find SSL keys and certificates. See [Command Options for Encrypted Connections](#).

- `--ssl-fips-mode={OFF|ON|STRICT}`

Controls whether to enable FIPS mode on the client side. The `--ssl-fips-mode` option differs from other `--ssl-xxx` options in that it is not used to establish encrypted connections, but rather to affect which cryptographic operations to permit. See [Section 6.8, “FIPS Support”](#).

These `--ssl-fips-mode` values are permitted:

- `OFF`: Disable FIPS mode.
- `ON`: Enable FIPS mode.
- `STRICT`: Enable “strict” FIPS mode.



#### Note

If the OpenSSL FIPS Object Module is not available, the only permitted value for `--ssl-fips-mode` is `OFF`. In this case, setting `--ssl-fips-mode` to `ON` or `STRICT` causes the client to produce a warning at startup and to operate in non-FIPS mode.

- `--tls-ciphersuites=ciphersuite_list`

The permissible ciphersuites for encrypted connections that use TLSv1.3. The value is a list of one or more colon-separated ciphersuite names. The ciphersuites that can be named for this option depend on the SSL library used to compile MySQL. For details, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](#).

- `--tls-version=protocol_list`

The permissible TLS protocols for encrypted connections. The value is a list of one or more comma-separated protocol names. The protocols that can be named for this option depend on the SSL library used to compile MySQL. For details, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](#).

- `--user=user_name, -u user_name`

The user name of the MySQL account used for connecting to the running server that is currently using one of the key migration keystores.

- `--verbose, -v`

Verbose mode. Produce more output about what the program does.

- `--version, -V`

Display version information and exit.

## 4.6.9 mysqlbinlog — Utility for Processing Binary Log Files

The server's binary log consists of files containing “events” that describe modifications to database contents. The server writes these files in binary format. To display their contents in text format, use the `mysqlbinlog` utility. You can also use `mysqlbinlog` to display the contents of relay log files written by a replica server in a replication setup because relay logs have the same format as binary logs. The binary log and relay log are discussed further in [Section 5.4.4, “The Binary Log”](#), and [Section 17.2.4, “Relay Log and Replication Metadata Repositories”](#).

Invoke `mysqlbinlog` like this:

```
mysqlbinlog [options] log_file ...
```

For example, to display the contents of the binary log file named `binlog.000003`, use this command:

```
mysqlbinlog binlog.000003
```

The output includes events contained in `binlog.000003`. For statement-based logging, event information includes the SQL statement, the ID of the server on which it was executed, the timestamp when the statement was executed, how much time it took, and so forth. For row-based logging, the event indicates a row change rather than an SQL statement. See [Section 17.2.1, “Replication Formats”](#), for information about logging modes.

Events are preceded by header comments that provide additional information. For example:

```
# at 141
#100309 9:28:36 server id 123 end_log_pos 245
  Query thread_id=3350 exec_time=11 error_code=0
```

In the first line, the number following `at` indicates the file offset, or starting position, of the event in the binary log file.

The second line starts with a date and time indicating when the statement started on the server where the event originated. For replication, this timestamp is propagated to replica servers. `server id` is the `server_id` value of the server where the event originated. `end_log_pos` indicates where the next event starts (that is, it is the end position of the current event + 1). `thread_id` indicates which thread executed the event. `exec_time` is the time spent executing the event, on a replication source server. On a replica, it is the difference of the end execution time on the replica minus the beginning execution time on the source. The difference serves as an indicator of how much replication lags behind the source. `error_code` indicates the result from executing the event. Zero means that no error occurred.



#### Note

When using event groups, the file offsets of events may be grouped together and the comments of events may be grouped together. Do not mistake these grouped events for blank file offsets.

The output from `mysqlbinlog` can be re-executed (for example, by using it as input to `mysql`) to redo the statements in the log. This is useful for recovery operations after an unexpected server exit. For other usage examples, see the discussion later in this section and in [Section 7.5, “Point-in-Time \(Incremental\) Recovery”](#). To execute the internal-use `BINLOG` statements used by `mysqlbinlog`, the user requires the `BINLOG_ADMIN` privilege (or the deprecated `SUPER` privilege), or the `REPLICATION_APPLIER` privilege plus the appropriate privileges to execute each log event.

You can use `mysqlbinlog` to read binary log files directly and apply them to the local MySQL server. You can also read binary logs from a remote server by using the `--read-from-remote-server` option. To read remote binary logs, the connection parameter options can be given to indicate how to connect to the server. These options are `--host`, `--password`, `--port`, `--protocol`, `--socket`, and `--user`.

When binary log files have been encrypted, which can be done from MySQL 8.0.14 onwards, `mysqlbinlog` cannot read them directly, but can read them from the server using the `--read-from-remote-server` option. Binary log files are encrypted when the server's `binlog_encryption` system variable is set to `ON`. The `SHOW BINARY LOGS` statement shows whether a particular binary log file is encrypted or unencrypted. Encrypted and unencrypted binary log files can also be distinguished using the magic number at the start of the file header for encrypted log files (`0xFD62696E`), which differs from that used for unencrypted log files (`0xFE62696E`). Note that from MySQL 8.0.14, `mysqlbinlog` returns a suitable error if you attempt to read an encrypted binary log file directly, but older versions of `mysqlbinlog` do not recognise the file as a binary log file at all. For more information on binary log encryption, see [Section 17.3.2, “Encrypting Binary Log Files and Relay Log Files”](#).

When binary log transaction payloads have been compressed, which can be done from MySQL 8.0.20 onwards, `mysqlbinlog` versions from that release on automatically decompress and decode the transaction payloads, and print them as they would uncompressed events. Older versions of `mysqlbinlog` cannot read compressed transaction payloads. When the server's `binlog_transaction_compression` system variable is set to `ON`, transaction

payloads are compressed and then written to the server's binary log file as a single event (a `Transaction_payload_event`). With the `--verbose` option, `mysqlbinlog` adds comments stating the compression algorithm used, the compressed payload size that was originally received, and the resulting payload size after decompression.



#### Note

The end position (`end_log_pos`) that `mysqlbinlog` states for an individual event that was part of a compressed transaction payload is the same as the end position of the original compressed payload. Multiple decompressed events can therefore have the same end position.

`mysqlbinlog`'s own connection compression does less if transaction payloads are already compressed, but still operates on uncompressed transactions and headers.

For more information on binary log transaction compression, see [Section 5.4.4.5, “Binary Log Transaction Compression”](#).

When running `mysqlbinlog` against a large binary log, be careful that the filesystem has enough space for the resulting files. To configure the directory that `mysqlbinlog` uses for temporary files, use the `TMPDIR` environment variable.

`mysqlbinlog` sets the value of `pseudo_replica_mode` or `pseudo_slave_mode` to true before executing any SQL statements. This system variable affects the handling of XA transactions, the `original_commit_timestamp` replication delay timestamp and the `original_server_version` system variable, and unsupported SQL modes.

`mysqlbinlog` supports the following options, which can be specified on the command line or in the `[mysqlbinlog]` and `[client]` groups of an option file. For information about option files used by MySQL programs, see [Section 4.2.2.2, “Using Option Files”](#).

**Table 4.22 mysqlbinlog Options**

| Option Name                              | Description                                                                                  | Introduced | Deprecated |
|------------------------------------------|----------------------------------------------------------------------------------------------|------------|------------|
| <code>--base64-output</code>             | Print binary log entries using base-64 encoding                                              |            |            |
| <code>--bind-address</code>              | Use specified network interface to connect to MySQL Server                                   |            |            |
| <code>--binlog-row-event-max-size</code> | Binary log max event size                                                                    |            |            |
| <code>--character-sets-dir</code>        | Directory where character sets are installed                                                 |            |            |
| <code>--compress</code>                  | Compress all information sent between client and server                                      | 8.0.17     | 8.0.18     |
| <code>--compression-algorithms</code>    | Permitted compression algorithms for connections to server                                   | 8.0.18     |            |
| <code>--connection-server-id</code>      | Used for testing and debugging. See text for applicable default values and other particulars |            |            |
| <code>--database</code>                  | List entries for just this database                                                          |            |            |

| Option Name             | Description                                                                                        | Introduced | Deprecated |
|-------------------------|----------------------------------------------------------------------------------------------------|------------|------------|
| --debug                 | Write debugging log                                                                                |            |            |
| --debug-check           | Print debugging information when program exits                                                     |            |            |
| --debug-info            | Print debugging information, memory, and CPU statistics when program exits                         |            |            |
| --default-auth          | Authentication plugin to use                                                                       |            |            |
| --defaults-extra-file   | Read named option file in addition to usual option files                                           |            |            |
| --defaults-file         | Read only named option file                                                                        |            |            |
| --defaults-group-suffix | Option group suffix value                                                                          |            |            |
| --disable-log-bin       | Disable binary logging                                                                             |            |            |
| --exclude-gtids         | Do not show any of the groups in the GTID set provided                                             |            |            |
| --force-if-open         | Read binary log files even if open or not closed properly                                          |            |            |
| --force-read            | If mysqlbinlog reads a binary log event that it does not recognize, it prints a warning            |            |            |
| --get-server-public-key | Request RSA public key from server                                                                 |            |            |
| --help                  | Display help message and exit                                                                      |            |            |
| --hexdump               | Display a hex dump of the log in comments                                                          |            |            |
| --host                  | Host on which MySQL server is located                                                              |            |            |
| --idempotent            | Cause the server to use idempotent mode while processing binary log updates from this session only |            |            |
| --include-gtids         | Show only the groups in the GTID set provided                                                      |            |            |
| --local-load            | Prepare local temporary files for LOAD DATA in the specified directory                             |            |            |
| --login-path            | Read login path options from .mylogin.cnf                                                          |            |            |
| --no-defaults           | Read no option files                                                                               |            |            |

| Option Name               | Description                                                                                                                                                                                                | Introduced | Deprecated |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| --offset                  | Skip the first N entries in the log                                                                                                                                                                        |            |            |
| --password                | Password to use when connecting to server                                                                                                                                                                  |            |            |
| --plugin-dir              | Directory where plugins are installed                                                                                                                                                                      |            |            |
| --port                    | TCP/IP port number for connection                                                                                                                                                                          |            |            |
| --print-defaults          | Print default options                                                                                                                                                                                      |            |            |
| --print-table-metadata    | Print table metadata                                                                                                                                                                                       |            |            |
| --protocol                | Transport protocol to use                                                                                                                                                                                  |            |            |
| --raw                     | Write events in raw (binary) format to output files                                                                                                                                                        |            |            |
| --read-from-remote-master | Read the binary log from a MySQL replication source server rather than reading a local log file                                                                                                            |            | 8.0.26     |
| --read-from-remote-server | Read binary log from MySQL server rather than local log file                                                                                                                                               |            |            |
| --read-from-remote-source | Read the binary log from a MySQL replication source server rather than reading a local log file                                                                                                            | 8.0.26     |            |
| --require-row-format      | Require row-based binary logging format                                                                                                                                                                    | 8.0.19     |            |
| --result-file             | Direct output to named file                                                                                                                                                                                |            |            |
| --rewrite-db              | Create rewrite rules for databases when playing back from logs written in row-based format. Can be used multiple times                                                                                     |            |            |
| --server-id               | Extract only those events created by the server having the given server ID                                                                                                                                 |            |            |
| --server-id-bits          | Tell mysqlbinlog how to interpret server IDs in binary log when log was written by a mysqld having its server-id-bits set to less than the maximum; supported only by MySQL Cluster version of mysqlbinlog |            |            |

| Option Name                                 | Description                                                                 | Introduced | Deprecated |
|---------------------------------------------|-----------------------------------------------------------------------------|------------|------------|
| --server-public-key-path                    | Path name to file containing RSA public key                                 |            |            |
| --set-charset                               | Add a SET NAMES charset_name statement to the output                        |            |            |
| --shared-memory-base-name                   | Shared-memory name for shared-memory connections (Windows only)             |            |            |
| --short-form                                | Display only the statements contained in the log                            |            |            |
| --skip-gtids                                | Do not include the GTIDs from the binary log files in the output dump file  |            |            |
| --socket                                    | Unix socket file or Windows named pipe to use                               |            |            |
| --ssl-ca                                    | File that contains list of trusted SSL Certificate Authorities              |            |            |
| --ssl-capath                                | Directory that contains trusted SSL Certificate Authority certificate files |            |            |
| --ssl-cert                                  | File that contains X.509 certificate                                        |            |            |
| --ssl-cipher                                | Permissible ciphers for connection encryption                               |            |            |
| --ssl-crl                                   | File that contains certificate revocation lists                             |            |            |
| --ssl-crlpath                               | Directory that contains certificate revocation-list files                   |            |            |
| --ssl-fips-mode                             | Whether to enable FIPS mode on client side                                  |            |            |
| --ssl-key                                   | File that contains X.509 key                                                |            |            |
| --ssl-mode                                  | Desired security state of connection to server                              |            |            |
| --ssl-session-data                          | File that contains SSL session data                                         | 8.0.29     |            |
| --ssl-session-data-continue-on-failed-reuse | Whether to establish connections if session reuse fails                     | 8.0.29     |            |
| --start-datetime                            | Read binary log from first event with timestamp equal to                    |            |            |

| Option Name                  | Description                                                                                                                | Introduced | Deprecated |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------|------------|
|                              | or later than datetime argument                                                                                            |            |            |
| --start-position             | Decode binary log from first event with position equal to or greater than argument                                         |            |            |
| --stop-datetime              | Stop reading binary log at first event with timestamp equal to or greater than datetime argument                           |            |            |
| --stop-never                 | Stay connected to server after reading last binary log file                                                                |            |            |
| --stop-never-slave-server-id | Slave server ID to report when connecting to server                                                                        |            |            |
| --stop-position              | Stop decoding binary log at first event with position equal to or greater than argument                                    |            |            |
| --tls-ciphersuites           | Permissible TLSv1.3 ciphersuites for encrypted connections                                                                 | 8.0.16     |            |
| --tls-version                | Permissible TLS protocols for encrypted connections                                                                        |            |            |
| --to-last-log                | Do not stop at the end of requested binary log from a MySQL server, but rather continue printing to end of last binary log |            |            |
| --user                       | MySQL user name to use when connecting to server                                                                           |            |            |
| --verbose                    | Reconstruct row events as SQL statements                                                                                   |            |            |
| --verify-binlog-checksum     | Verify checksums in binary log                                                                                             |            |            |
| --version                    | Display version information and exit                                                                                       |            |            |
| --zstd-compression-level     | Compression level for connections to server that use zstd compression                                                      | 8.0.18     |            |

- `--help`, `-?`

Display a help message and exit.

- `--base64-output=value`

This option determines when events should be displayed encoded as base-64 strings using `BINLOG` statements. The option has these permissible values (not case-sensitive):

- `AUTO` ("automatic") or `UNSPEC` ("unspecified") displays `BINLOG` statements automatically when necessary (that is, for format description events and row events). If no `--base64-output` option is given, the effect is the same as `--base64-output=AUTO`.



#### Note

Automatic `BINLOG` display is the only safe behavior if you intend to use the output of `mysqlbinlog` to re-execute binary log file contents. The other option values are intended only for debugging or testing purposes because they may produce output that does not include all events in executable form.

- `NEVER` causes `BINLOG` statements not to be displayed. `mysqlbinlog` exits with an error if a row event is found that must be displayed using `BINLOG`.
- `DECODE-ROWS` specifies to `mysqlbinlog` that you intend for row events to be decoded and displayed as commented SQL statements by also specifying the `--verbose` option. Like `NEVER`, `DECODE-ROWS` suppresses display of `BINLOG` statements, but unlike `NEVER`, it does not exit with an error if a row event is found.

For examples that show the effect of `--base64-output` and `--verbose` on row event output, see [Section 4.6.9.2, “mysqlbinlog Row Event Display”](#).

- `--bind-address=ip_address`

On a computer having multiple network interfaces, use this option to select which interface to use for connecting to the MySQL server.

- `--binlog-row-event-max-size=N`

| Command-Line Format | <code>--binlog-row-event-max-size=#</code> |
|---------------------|--------------------------------------------|
| Type                | Numeric                                    |
| Default Value       | <code>4294967040</code>                    |
| Minimum Value       | <code>256</code>                           |
| Maximum Value       | <code>18446744073709547520</code>          |

Specify the maximum size of a row-based binary log event, in bytes. Rows are grouped into events smaller than this size if possible. The value should be a multiple of 256. The default is 4GB.

- `--character-sets-dir=dir_name`

The directory where character sets are installed. See [Section 10.15, “Character Set Configuration”](#).

- `--compress`

Compress all information sent between the client and the server if possible. See [Section 4.2.8, “Connection Compression Control”](#).

This option was added in MySQL 8.0.17. As of MySQL 8.0.18 it is deprecated. Expect it to be removed in a future version of MySQL. See [Configuring Legacy Connection Compression](#).

- `--compression-algorithms=value`

The permitted compression algorithms for connections to the server. The available algorithms are the same as for the `protocol_compression_algorithms` system variable. The default value is `uncompressed`.

For more information, see [Section 4.2.8, “Connection Compression Control”](#).

This option was added in MySQL 8.0.18.

- `--connection-server-id=server_id`

`--connection-server-id` specifies the server ID that `mysqlbinlog` reports when it connects to the server. It can be used to avoid a conflict with the ID of a replica server or another `mysqlbinlog` process.

If the `--read-from-remote-server` option is specified, `mysqlbinlog` reports a server ID of 0, which tells the server to disconnect after sending the last log file (nonblocking behavior). If the `--stop-never` option is also specified to maintain the connection to the server, `mysqlbinlog` reports a server ID of 1 by default instead of 0, and `--connection-server-id` can be used to replace that server ID if required. See [Section 4.6.9.4, “Specifying the mysqlbinlog Server ID”](#).

- `--database=db_name, -d db_name`

This option causes `mysqlbinlog` to output entries from the binary log (local log only) that occur while `db_name` is been selected as the default database by `USE`.

The `--database` option for `mysqlbinlog` is similar to the `--binlog-do-db` option for `mysqld`, but can be used to specify only one database. If `--database` is given multiple times, only the last instance is used.

The effects of this option depend on whether the statement-based or row-based logging format is in use, in the same way that the effects of `--binlog-do-db` depend on whether statement-based or row-based logging is in use.

**Statement-based logging.** The `--database` option works as follows:

- While `db_name` is the default database, statements are output whether they modify tables in `db_name` or a different database.
- Unless `db_name` is selected as the default database, statements are not output, even if they modify tables in `db_name`.
- There is an exception for `CREATE DATABASE`, `ALTER DATABASE`, and `DROP DATABASE`. The database being *created, altered, or dropped* is considered to be the default database when determining whether to output the statement.

Suppose that the binary log was created by executing these statements using statement-based-logging:

```
INSERT INTO test.t1 (i) VALUES(100);
INSERT INTO db2.t2 (j)  VALUES(200);
USE test;
INSERT INTO test.t1 (i) VALUES(101);
INSERT INTO t1 (i)      VALUES(102);
INSERT INTO db2.t2 (j)  VALUES(201);
USE db2;
INSERT INTO test.t1 (i) VALUES(103);
INSERT INTO db2.t2 (j)  VALUES(202);
```

```
INSERT INTO t2 (j)      VALUES(203);
```

`mysqlbinlog --database=test` does not output the first two `INSERT` statements because there is no default database. It outputs the three `INSERT` statements following `USE test`, but not the three `INSERT` statements following `USE db2`.

`mysqlbinlog --database=db2` does not output the first two `INSERT` statements because there is no default database. It does not output the three `INSERT` statements following `USE test`, but does output the three `INSERT` statements following `USE db2`.

**Row-based logging.** `mysqlbinlog` outputs only entries that change tables belonging to `db_name`. The default database has no effect on this. Suppose that the binary log just described was created using row-based logging rather than statement-based logging. `mysqlbinlog --database=test` outputs only those entries that modify `t1` in the test database, regardless of whether `USE` was issued or what the default database is.

If a server is running with `binlog_format` set to `MIXED` and you want it to be possible to use `mysqlbinlog` with the `--database` option, you must ensure that tables that are modified are in the database selected by `USE`. (In particular, no cross-database updates should be used.)

When used together with the `--rewrite-db` option, the `--rewrite-db` option is applied first; then the `--database` option is applied, using the rewritten database name. The order in which the options are provided makes no difference in this regard.

- `--debug[=debug_options], -# [debug_options]`

Write a debugging log. A typical `debug_options` string is `d:t:o,file_name`. The default is `d:t:o,/tmp/mysqlbinlog.trace`.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `--debug-check`

Print some debugging information when the program exits.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `--debug-info`

Print debugging information and memory and CPU usage statistics when the program exits.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `--default-auth=plugin`

A hint about which client-side authentication plugin to use. See [Section 6.2.17, “Pluggable Authentication”](#).

- `--defaults-extra-file=file_name`

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.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--defaults-file=file_name`

Use 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`, client programs read `.mylogin.cnf`.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--defaults-group-suffix=str`

Read not only the usual option groups, but also groups with the usual names and a suffix of `str`. For example, `mysqlbinlog` normally reads the `[client]` and `[mysqlbinlog]` groups. If this option is given as `--defaults-group-suffix=_other`, `mysqlbinlog` also reads the `[client_other]` and `[mysqlbinlog_other]` groups.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--disable-log-bin, -D`

Disable binary logging. This is useful for avoiding an endless loop if you use the `--to-last-log` option and are sending the output to the same MySQL server. This option also is useful when restoring after an unexpected exit to avoid duplication of the statements you have logged.

This option causes `mysqlbinlog` to include a `SET sql_log_bin = 0` statement in its output to disable binary logging of the remaining output. Manipulating the session value of the `sql_log_bin` system variable is a restricted operation, so this option requires that you have privileges sufficient to set restricted session variables. See [Section 5.1.9.1, “System Variable Privileges”](#).

- `--exclude-gtids=gtid_set`

Do not display any of the groups listed in the `gtid_set`.

- `--force-if-open, -F`

Read binary log files even if they are open or were not closed properly.

- `--force-read, -f`

With this option, if `mysqlbinlog` reads a binary log event that it does not recognize, it prints a warning, ignores the event, and continues. Without this option, `mysqlbinlog` stops if it reads such an event.

- `--get-server-public-key`

Request from the server the public key required for RSA key pair-based password exchange. This option applies to clients that authenticate with the `caching_sha2_password` authentication plugin. For that plugin, the server does not send the public key unless requested. This option is ignored for accounts that do not authenticate with that plugin. It is also ignored if RSA-based password exchange is not used, as is the case when the client connects to the server using a secure connection.

If `--server-public-key-path=file_name` is given and specifies a valid public key file, it takes precedence over `--get-server-public-key`.

For information about the `caching_sha2_password` plugin, see [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](#).

- `--hexdump, -H`

Display a hex dump of the log in comments, as described in [Section 4.6.9.1, “mysqlbinlog Hex Dump Format”](#). The hex output can be helpful for replication debugging.

- `--host=host_name, -h host_name`

Get the binary log from the MySQL server on the given host.

- `--idempotent`

Tell the MySQL Server to use idempotent mode while processing updates; this causes suppression of any duplicate-key or key-not-found errors that the server encounters in the current session while processing updates. This option may prove useful whenever it is desirable or necessary to replay one or more binary logs to a MySQL Server which may not contain all of the data to which the logs refer.

The scope of effect for this option includes the current `mysqlbinlog` client and session only.

- `--include-gtids=gtid_set`

Display only the groups listed in the `gtid_set`.

- `--local-load=dir_name, -l dir_name`

For data loading operations corresponding to `LOAD DATA` statements, `mysqlbinlog` extracts the files from the binary log events, writes them as temporary files to the local file system, and writes `LOAD DATA LOCAL` statements to cause the files to be loaded. By default, `mysqlbinlog` writes these temporary files to an operating system-specific directory. The `--local-load` option can be used to explicitly specify the directory where `mysqlbinlog` should prepare local temporary files.

Because other processes can write files to the default system-specific directory, it is advisable to specify the `--local-load` option to `mysqlbinlog` to designate a different directory for data files, and then designate that same directory by specifying the `--load-data-local-dir` option to `mysql` when processing the output from `mysqlbinlog`. For example:

```
mysqlbinlog --local-load=/my/local/data ...
| mysql --load-data-local-dir=/my/local/data ...
```



### Important

These temporary files are not automatically removed by `mysqlbinlog` or any other MySQL program.

- `--login-path=name`

Read options from the named login path in the `.mylogin.cnf` login path file. A “login path” is an option group containing options that specify which MySQL server to connect to and which account to authenticate as. To create or modify a login path file, use the `mysql_config_editor` utility. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--no-defaults`

Do not read any option files. If program startup fails due to reading unknown options from an option file, `--no-defaults` can be used to prevent them from being read.

The exception is that the `.mylogin.cnf` file is read in all cases, if it exists. This permits passwords to be specified in a safer way than on the command line even when `--no-defaults`

is used. To create `.mylogin.cnf`, use the `mysql_config_editor` utility. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--offset=N, -o N`  
Skip the first `N` entries in the log.
- `--open-files-limit=N`  
Specify the number of open file descriptors to reserve.
- `--password[=password], -p[password]`

The password of the MySQL account used for connecting to the server. The password value is optional. If not given, `mysqlbinlog` prompts for one. If given, there must be *no space* between `--password=` or `-p` and the password following it. If no password option is specified, the default is to send no password.

Specifying a password on the command line should be considered insecure. To avoid giving the password on the command line, use an option file. See [Section 6.1.2.1, “End-User Guidelines for Password Security”](#).

To explicitly specify that there is no password and that `mysqlbinlog` should not prompt for one, use the `--skip-password` option.

- `--plugin-dir=dir_name`  
The directory in which to look for plugins. Specify this option if the `--default-auth` option is used to specify an authentication plugin but `mysqlbinlog` does not find it. See [Section 6.2.17, “Pluggable Authentication”](#).
- `--port=port_num, -P port_num`

The TCP/IP port number to use for connecting to a remote server.

- `--print-defaults`  
Print the program name and all options that it gets from option files.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--print-table-metadata`  
Print table related metadata from the binary log. Configure the amount of table related metadata binary logged using `binlog-row-metadata`.
- `--protocol={TCP|SOCKET|PIPE|MEMORY}`

The transport protocol to use for connecting to the server. It is useful when the other connection parameters normally result in use of a protocol other than the one you want. For details on the permissible values, see [Section 4.2.7, “Connection Transport Protocols”](#).

- `--raw`

By default, `mysqlbinlog` reads binary log files and writes events in text format. The `--raw` option tells `mysqlbinlog` to write them in their original binary format. Its use requires that `--read-from-remote-server` also be used because the files are requested from a server. `mysqlbinlog` writes one output file for each file read from the server. The `--raw` option can be used to make a backup of a server's binary log. With the `--stop-never` option, the backup is “live” because `mysqlbinlog`

stays connected to the server. By default, output files are written in the current directory with the same names as the original log files. Output file names can be modified using the `--result-file` option. For more information, see [Section 4.6.9.3, “Using mysqlbinlog to Back Up Binary Log Files”](#).

- `--read-from-remote-source=type`

From MySQL 8.0.26, use `--read-from-remote-source`, and before MySQL 8.0.26, use `--read-from-remote-master`. Both options have the same effect. The options read binary logs from a MySQL server with the `COM_BINLOG_DUMP` or `COM_BINLOG_DUMP_GTID` commands by setting the option value to either `BINLOG-DUMP-NON-GTIDS` or `BINLOG-DUMP-GTIDS`, respectively. If `--read-from-remote-source=BINLOG-DUMP-GTIDS` or `--read-from-remote-master=BINLOG-DUMP-GTIDS` is combined with `--exclude-gtids`, transactions can be filtered out on the source, avoiding unnecessary network traffic.

The connection parameter options are used with these options or the `--read-from-remote-server` option. These options are `--host`, `--password`, `--port`, `--protocol`, `--socket`, and `--user`. If none of the remote options is specified, the connection parameter options are ignored.

The `REPLICATION SLAVE` privilege is required to use these options.

- `--read-from-remote-master=type`

Use this option before MySQL 8.0.26 rather than `--read-from-remote-source`. Both options have the same effect.

- `--read-from-remote-server=file_name, -R`

Read the binary log from a MySQL server rather than reading a local log file. This option requires that the remote server be running. It works only for binary log files on the remote server, not relay log files, and takes only the binary log file name (including the numeric suffix) as its argument, while ignoring any path.

The connection parameter options are used with this option or the `--read-from-remote-master` option. These options are `--host`, `--password`, `--port`, `--protocol`, `--socket`, and `--user`. If neither of the remote options is specified, the connection parameter options are ignored.

The `REPLICATION SLAVE` privilege is required to use this option.

This option is like `--read-from-remote-master=BINLOG-DUMP-NON-GTIDS`.

- `--result-file=name, -r name`

Without the `--raw` option, this option indicates the file to which `mysqlbinlog` writes text output. With `--raw`, `mysqlbinlog` writes one binary output file for each log file transferred from the server, writing them by default in the current directory using the same names as the original log file. In this case, the `--result-file` option value is treated as a prefix that modifies output file names.

- `--require-row-format`

Require row-based binary logging format for events. This option enforces row-based replication events for `mysqlbinlog` output. The stream of events produced with this option would be accepted by a replication channel that is secured using the `REQUIRE_ROW_FORMAT` option of the `CHANGE REPLICATION SOURCE TO` statement (from MySQL 8.0.23) or `CHANGE MASTER TO` statement (before MySQL 8.0.23). `binlog_format=ROW` must be set on the server where the binary log was written. When you specify this option, `mysqlbinlog` stops with an error message if it encounters any events that are disallowed under the `REQUIRE_ROW_FORMAT` restrictions, including `LOAD DATA INFILE` instructions, creating or dropping temporary tables, `INTVAR`, `RAND`, or `USER_VAR` events, and non-row-based events within a DML transaction. `mysqlbinlog` also prints a `SET @@session.require_row_format` statement at the start of its output to apply the restrictions when the output is executed, and does not print the `SET @@session.pseudo_thread_id` statement.

This option was added in MySQL 8.0.19.

- `--rewrite-db='from_name->to_name'`

When reading from a row-based or statement-based log, rewrite all occurrences of `from_name` to `to_name`. Rewriting is done on the rows, for row-based logs, as well as on the `USE` clauses, for statement-based logs.



### Warning

Statements in which table names are qualified with database names are not rewritten to use the new name when using this option.

The rewrite rule employed as a value for this option is a string having the form '`from_name->to_name`', as shown previously, and for this reason must be enclosed by quotation marks.

To employ multiple rewrite rules, specify the option multiple times, as shown here:

```
mysqlbinlog --rewrite-db='dbcurrent->dbold' --rewrite-db='dbtest->dbcurrent' \
binlog.00001 > /tmp/statements.sql
```

When used together with the `--database` option, the `--rewrite-db` option is applied first; then `--database` option is applied, using the rewritten database name. The order in which the options are provided makes no difference in this regard.

This means that, for example, if `mysqlbinlog` is started with `--rewrite-db='mydb->yourdb'` `--database=yourdb`, then all updates to any tables in databases `mydb` and `yourdb` are included in the output. On the other hand, if it is started with `--rewrite-db='mydb->yourdb'` `--database=mydb`, then `mysqlbinlog` outputs no statements at all: since all updates to `mydb` are first rewritten as updates to `yourdb` before applying the `--database` option, there remain no updates that match `--database=mydb`.

- `--server-id=id`

Display only those events created by the server having the given server ID.

- `--server-id-bits=N`

Use only the first `N` bits of the `server_id` to identify the server. If the binary log was written by a `mysqld` with server-id-bits set to less than 32 and user data stored in the most significant bit, running `mysqlbinlog` with `--server-id-bits` set to 32 enables this data to be seen.

This option is supported only by the version of `mysqlbinlog` supplied with the NDB Cluster distribution, or built with NDB Cluster support.

- `--server-public-key-path=file_name`

The path name to a file in PEM format containing a client-side copy of the public key required by the server for RSA key pair-based password exchange. This option applies to clients that authenticate with the `sha256_password` or `caching_sha2_password` authentication plugin. This option is ignored for accounts that do not authenticate with one of those plugins. It is also ignored if RSA-

based password exchange is not used, as is the case when the client connects to the server using a secure connection.

If `--server-public-key-path=file_name` is given and specifies a valid public key file, it takes precedence over `--get-server-public-key`.

For `sha256_password`, this option applies only if MySQL was built using OpenSSL.

For information about the `sha256_password` and `caching_sha2_password` plugins, see [Section 6.4.1.3, “SHA-256 Pluggable Authentication”](#), and [Section 6.4.1.2, “Caching SHA-2 Pluggable Authentication”](#).

- `--set-charset=charset_name`

Add a `SET NAMES charset_name` statement to the output to specify the character set to be used for processing log files.

- `--shared-memory-base-name=name`

On Windows, the shared-memory name to use for connections made using shared memory to a local server. The default value is `MYSQL`. The shared-memory name is case-sensitive.

This option applies only if the server was started with the `shared_memory` system variable enabled to support shared-memory connections.

- `--short-form, -s`

Display only the statements contained in the log, without any extra information or row-based events. This is for testing only, and should not be used in production systems. It is deprecated, and you should expect it to be removed in a future release.

- `--skip-gtids[=(true|false)]`

Do not include the GTIDs from the binary log files in the output dump file. For example:

```
mysqlbinlog --skip-gtids binlog.000001 > /tmp/dump.sql
mysql -u root -p -e "source /tmp/dump.sql"
```

You should not normally use this option in production or in recovery, except in the specific, and rare, scenarios where the GTIDs are actively unwanted. For example, an administrator might want to duplicate selected transactions (such as table definitions) from a deployment to another, unrelated, deployment that will not replicate to or from the original. In that scenario, `--skip-gtids` can be used to enable the administrator to apply the transactions as if they were new, and ensure that the deployments remain unrelated. However, you should only use this option if the inclusion of the GTIDs causes a known issue for your use case.

- `--socket=path, -S path`

For connections to `localhost`, the Unix socket file to use, or, on Windows, the name of the named pipe to use.

On Windows, this option applies only if the server was started with the `named_pipe` system variable enabled to support named-pipe connections. In addition, the user making the connection must be a member of the Windows group specified by the `named_pipe_full_access_group` system variable.

- `--ssl*`

Options that begin with `--ssl` specify whether to connect to the server using encryption and indicate where to find SSL keys and certificates. See [Command Options for Encrypted Connections](#).

- `--ssl-fips-mode={OFF|ON|STRICT}`

Controls whether to enable FIPS mode on the client side. The `--ssl-fips-mode` option differs from other `--ssl-xxx` options in that it is not used to establish encrypted connections, but rather to affect which cryptographic operations to permit. See [Section 6.8, “FIPS Support”](#).

These `--ssl-fips-mode` values are permitted:

- `OFF`: Disable FIPS mode.
- `ON`: Enable FIPS mode.
- `STRICT`: Enable “strict” FIPS mode.



#### Note

If the OpenSSL FIPS Object Module is not available, the only permitted value for `--ssl-fips-mode` is `OFF`. In this case, setting `--ssl-fips-mode` to `ON` or `STRICT` causes the client to produce a warning at startup and to operate in non-FIPS mode.

- `--start-datetime=datetime`

Start reading the binary log at the first event having a timestamp equal to or later than the `datetime` argument. The `datetime` value is relative to the local time zone on the machine where you run `mysqlbinlog`. The value should be in a format accepted for the `DATETIME` or `TIMESTAMP` data types. For example:

```
mysqlbinlog --start-datetime="2005-12-25 11:25:56" binlog.000003
```

This option is useful for point-in-time recovery. See [Section 7.5, “Point-in-Time \(Incremental\) Recovery”](#).

- `--start-position=N, -j N`

Start decoding the binary log at the log position `N`, including in the output any events that begin at position `N` or after. The position is a byte point in the log file, not an event counter; it needs to point to the starting position of an event to generate useful output. This option applies to the first log file named on the command line.

Prior to MySQL 8.0.33, the maximum value supported for this option was  $4294967295 (2^{32}-1)$ . In MySQL 8.0.33 and later, it is  $18446744073709551616 (2^{64}-1)$ , unless `--read-from-remote-server` or `--read-from-remote-source` is also used, in which case the maximum is 4294967295.

This option is useful for point-in-time recovery. See [Section 7.5, “Point-in-Time \(Incremental\) Recovery”](#).

- `--stop-datetime=datetime`

Stop reading the binary log at the first event having a timestamp equal to or later than the `datetime` argument. See the description of the `--start-datetime` option for information about the `datetime` value.

This option is useful for point-in-time recovery. See [Section 7.5, “Point-in-Time \(Incremental\) Recovery”](#).

- `--stop-never`

This option is used with `--read-from-remote-server`. It tells `mysqlbinlog` to remain connected to the server. Otherwise `mysqlbinlog` exits when the last log file has been transferred from the server. `--stop-never` implies `--to-last-log`, so only the first log file to transfer need be named on the command line.

--stop-never is commonly used with --raw to make a live binary log backup, but also can be used without --raw to maintain a continuous text display of log events as the server generates them.

With --stop-never, by default, mysqlbinlog reports a server ID of 1 when it connects to the server. Use --connection-server-id to explicitly specify an alternative ID to report. It can be used to avoid a conflict with the ID of a replica server or another mysqlbinlog process. See [Section 4.6.9.4, “Specifying the mysqlbinlog Server ID”](#).

- `--stop-never-slave-server-id=id`

This option is deprecated; expect it to be removed in a future release. Use the --connection-server-id option instead to specify a server ID for mysqlbinlog to report.

- `--stop-position=N`

Stop decoding the binary log at the log position *N*, excluding from the output any events that begin at position *N* or after. The position is a byte point in the log file, not an event counter; it needs to point to a spot after the starting position of the last event you want to include in the output. The event starting before position *N* and finishing at or after the position is the last event to be processed. This option applies to the last log file named on the command line.

This option is useful for point-in-time recovery. See [Section 7.5, “Point-in-Time \(Incremental\) Recovery”](#).

- `--tls-ciphersuites=ciphersuite_list`

The permissible ciphersuites for encrypted connections that use TLSv1.3. The value is a list of one or more colon-separated ciphersuite names. The ciphersuites that can be named for this option depend on the SSL library used to compile MySQL. For details, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](#).

This option was added in MySQL 8.0.16.

- `--tls-version=protocol_list`

The permissible TLS protocols for encrypted connections. The value is a list of one or more comma-separated protocol names. The protocols that can be named for this option depend on the SSL library used to compile MySQL. For details, see [Section 6.3.2, “Encrypted Connection TLS Protocols and Ciphers”](#).

- `--to-last-log, -t`

Do not stop at the end of the requested binary log from a MySQL server, but rather continue printing until the end of the last binary log. If you send the output to the same MySQL server, this may lead to an endless loop. This option requires `--read-from-remote-server`.

- `--user=user_name, -u user_name`

The user name of the MySQL account to use when connecting to a remote server.

If you are using the `Rewriter` plugin with MySQL 8.0.31 or later, you should grant this user the `SKIP_QUERY_REWRITE` privilege.

- `--verbose, -v`

Reconstruct row events and display them as commented SQL statements, with table partition information where applicable. If this option is given twice (by passing in either `-vv` or `--verbose --verbose`), the output includes comments to indicate column data types and some metadata, and informational log events such as row query log events if the `binlog_rows_query_log_events` system variable is set to `TRUE`.

For examples that show the effect of `--base64-output` and `--verbose` on row event output, see [Section 4.6.9.2, “mysqlbinlog Row Event Display”](#).

- `--verify-binlog-checksum, -c`

Verify checksums in binary log files.

- `--version, -V`

Display version information and exit.

The `mysqlbinlog` version number shown when using this option is 3.4.

- `--zstd-compression-level=level`

The compression level to use for connections to the server that use the `zstd` compression algorithm. The permitted levels are from 1 to 22, with larger values indicating increasing levels of compression. The default `zstd` compression level is 3. The compression level setting has no effect on connections that do not use `zstd` compression.

For more information, see [Section 4.2.8, “Connection Compression Control”](#).

This option was added in MySQL 8.0.18.

You can pipe the output of `mysqlbinlog` into the `mysql` client to execute the events contained in the binary log. This technique is used to recover from an unexpected exit when you have an old backup (see [Section 7.5, “Point-in-Time \(Incremental\) Recovery”](#)). For example:

```
mysqlbinlog binlog.000001 | mysql -u root -p
```

Or:

```
mysqlbinlog binlog.[0-9]* | mysql -u root -p
```

If the statements produced by `mysqlbinlog` may contain `BLOB` values, these may cause problems when `mysql` processes them. In this case, invoke `mysql` with the `--binary-mode` option.

You can also redirect the output of `mysqlbinlog` to a text file instead, if you need to modify the statement log first (for example, to remove statements that you do not want to execute for some reason). After editing the file, execute the statements that it contains by using it as input to the `mysql` program:

```
mysqlbinlog binlog.000001 > tmpfile  
... edit tmpfile ...  
mysql -u root -p < tmpfile
```

When `mysqlbinlog` is invoked with the `--start-position` option, it displays only those events with an offset in the binary log greater than or equal to a given position (the given position must match the start of one event). It also has options to stop and start when it sees an event with a given date and time. This enables you to perform point-in-time recovery using the `--stop-datetime` option (to be able to say, for example, “roll forward my databases to how they were today at 10:30 a.m.”).

**Processing multiple files.** If you have more than one binary log to execute on the MySQL server, the safe method is to process them all using a single connection to the server. Here is an example that demonstrates what may be *unsafe*:

```
mysqlbinlog binlog.000001 | mysql -u root -p # DANGER!!  
mysqlbinlog binlog.000002 | mysql -u root -p # DANGER!!
```

Processing binary logs this way using multiple connections to the server causes problems if the first log file contains a `CREATE TEMPORARY TABLE` statement and the second log contains a statement that uses the temporary table. When the first `mysql` process terminates, the server drops the temporary table. When the second `mysql` process attempts to use the table, the server reports “unknown table.”

To avoid problems like this, use a *single* `mysql` process to execute the contents of all binary logs that you want to process. Here is one way to do so:

```
mysqlbinlog binlog.000001 binlog.000002 | mysql -u root -p
```

Another approach is to write all the logs to a single file and then process the file:

```
mysqlbinlog binlog.000001 > /tmp/statements.sql
mysqlbinlog binlog.000002 >> /tmp/statements.sql
mysql -u root -p -e "source /tmp/statements.sql"
```

From MySQL 8.0.12, you can also supply multiple binary log files to `mysqlbinlog` as streamed input using a shell pipe. An archive of compressed binary log files can be decompressed and provided directly to `mysqlbinlog`. In this example, `binlog-files_1.gz` contains multiple binary log files for processing. The pipeline extracts the contents of `binlog-files_1.gz`, pipes the binary log files to `mysqlbinlog` as standard input, and pipes the output of `mysqlbinlog` into the `mysql` client for execution:

```
gzip -cd binlog-files_1.gz | ./mysqlbinlog - | ./mysql -uroot -p
```

You can specify more than one archive file, for example:

```
gzip -cd binlog-files_1.gz binlog-files_2.gz | ./mysqlbinlog - | ./mysql -uroot -p
```

For streamed input, do not use `--stop-position`, because `mysqlbinlog` cannot identify the last log file to apply this option.

**LOAD DATA operations.** `mysqlbinlog` can produce output that reproduces a `LOAD DATA` operation without the original data file. `mysqlbinlog` copies the data to a temporary file and writes a `LOAD DATA LOCAL` statement that refers to the file. The default location of the directory where these files are written is system-specific. To specify a directory explicitly, use the `--local-load` option.

Because `mysqlbinlog` converts `LOAD DATA` statements to `LOAD DATA LOCAL` statements (that is, it adds `LOCAL`), both the client and the server that you use to process the statements must be configured with the `LOCAL` capability enabled. See [Section 6.1.6, “Security Considerations for LOAD DATA LOCAL”](#).



### Warning

The temporary files created for `LOAD DATA LOCAL` statements are *not* automatically deleted because they are needed until you actually execute those statements. You should delete the temporary files yourself after you no longer need the statement log. The files can be found in the temporary file directory and have names like `original_file_name-#-#`.

#### 4.6.9.1 mysqlbinlog Hex Dump Format

The `--hexdump` option causes `mysqlbinlog` to produce a hex dump of the binary log contents:

```
mysqlbinlog --hexdump source-bin.000001
```

The hex output consists of comment lines beginning with `#`, so the output might look like this for the preceding command:

```
/*!40019 SET @SESSION.max_insert_delayed_threads=0*/;
/*!50003 SET @OLD_COMPLETION_TYPE=@@COMPLETION_TYPE,COMPLETION_TYPE=0*/;
# at 4
#051024 17:24:13 server id 1 end_log_pos 98
# Position    Timestamp     Type      Master ID      Size      Master Pos      Flags
# 00000004 9d fc 5c 43 0f 01 00 00 00 5e 00 00 00 62 00 00 00 00 00
# 00000017 04 00 35 2e 30 2e 31 35 2d 64 65 62 75 67 2d 6c |..5.0.15.debug.1|
# 00000027 6f 67 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |og.....|
# 00000037 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |.....|
# 00000047 00 00 00 00 9d fc 5c 43 13 38 0d 00 08 00 12 00 |.....C.8.....|
# 00000057 04 04 04 04 12 00 00 4b 00 04 1a                 |.....K...|
#          Start: binlog v 4, server v 5.0.15-debug-log created 051024 17:24:13
#          at startup
```

```
ROLLBACK;
```

Hex dump output currently contains the elements in the following list. This format is subject to change. For more information about binary log format, see [MySQL Internals: The Binary Log](#).

- **Position**: The byte position within the log file.
- **Timestamp**: The event timestamp. In the example shown, '9d fc 5c 43' is the representation of '051024 17:24:13' in hexadecimal.
- **Type**: The event type code.
- **Master ID**: The server ID of the replication source server that created the event.
- **Size**: The size in bytes of the event.
- **Master Pos**: The position of the next event in the original source's binary log file.
- **Flags**: Event flag values.

#### 4.6.9.2 mysqlbinlog Row Event Display

The following examples illustrate how `mysqlbinlog` displays row events that specify data modifications. These correspond to events with the `WRITE_ROWS_EVENT`, `UPDATE_ROWS_EVENT`, and `DELETE_ROWS_EVENT` type codes. The `--base64-output=DECODE-ROWS` and `--verbose` options may be used to affect row event output.

Suppose that the server is using row-based binary logging and that you execute the following sequence of statements:

```
CREATE TABLE t
(
    id      INT NOT NULL,
    name    VARCHAR(20) NOT NULL,
    date    DATE NULL
) ENGINE = InnoDB;

START TRANSACTION;
INSERT INTO t VALUES(1, 'apple', NULL);
UPDATE t SET name = 'pear', date = '2009-01-01' WHERE id = 1;
DELETE FROM t WHERE id = 1;
COMMIT;
```

By default, `mysqlbinlog` displays row events encoded as base-64 strings using `BINLOG` statements. Omitting extraneous lines, the output for the row events produced by the preceding statement sequence looks like this:

```
$> mysqlbinlog log_file
...
# at 218
#080828 15:03:08 server id 1  end_log_pos 258    Write_rows: table id 17 flags: STMT_END_F
BINLOG '
fAS3SBMAAAALAAAAnAAAAAAABEAAAAAAAABHR1c3QAXQAAwMPCgIUAAQ=
fAS3SBcBAAAIAAAAIBAAAQABEAAAAAAEAA//8AQAAAAbcHBsZQ==

'/*!*/;
...
# at 302
#080828 15:03:08 server id 1  end_log_pos 356    Update_rows: table id 17 flags: STMT_END_F
BINLOG '
fAS3SBMAAAALAAAAC4BAAAABEAAAAAAAABHR1c3QAXQAAwMPCgIUAAQ=
fAS3SBgBAAAANGAAAGQBAAAQABEAAAAAAEAA///AEAAAAYXBwbGX4AQAAAARwZWFFyIbIP
'/*!*/;
...
# at 400
#080828 15:03:08 server id 1  end_log_pos 442    Delete_rows: table id 17 flags: STMT_END_F
BINLOG '
```

```
fAS3SBMBAAAALAAAAJABAAAABAAAAAAAABHRlc3QAXQAAwMPCgIUAAQ=
fAS3SBkBAAAAGAAALoBAAAQABAAAAAAEAA//4AQAAAARwZWfYIbIP
'/*!*/;
```

To see the row events as comments in the form of “pseudo-SQL” statements, run `mysqlbinlog` with the `--verbose` or `-v` option. This output level also shows table partition information where applicable. The output contains lines beginning with `###`:

```
$> mysqlbinlog -v log_file
...
# at 218
#080828 15:03:08 server id 1  end_log_pos 258    Write_rows: table id 17 flags: STMT_END_F

BINLOG '
fAS3SBMBAAAALAAAANoAAAAABAAAAAAAABHRlc3QAXQAAwMPCgIUAAQ=
fAS3SBcBAAAAGAAAAIBAAAQABAAAAAAEAA//8AQAAAAvhcHBsZQ==
'/*!*/;
### INSERT INTO test.t
### SET
###   @1=1
###   @2='apple'
###   @3=NULL
...
# at 302
#080828 15:03:08 server id 1  end_log_pos 356    Update_rows: table id 17 flags: STMT_END_F

BINLOG '
fAS3SBMBAAAALAAAAC4BAAAABAAAAAAAABHRlc3QAXQAAwMPCgIUAAQ=
fAS3SBgBAAAANGAAAGQBAAAQABAAAAAAEAA///AEAAAAYXBwbGX4AQAAAARwZWfYIbIP
'/*!*/;
### UPDATE test.t
### WHERE
###   @1=1
###   @2='apple'
###   @3=NULL
### SET
###   @1=1
###   @2='pear'
###   @3='2009:01:01'
...
# at 400
#080828 15:03:08 server id 1  end_log_pos 442    Delete_rows: table id 17 flags: STMT_END_F

BINLOG '
fAS3SBMBAAAALAAAAJABAAAABAAAAAAAABHRlc3QAXQAAwMPCgIUAAQ=
fAS3SBkBAAAAGAAALoBAAAQABAAAAAAEAA//4AQAAAARwZWfYIbIP
'/*!*/;
### DELETE FROM test.t
### WHERE
###   @1=1
###   @2='pear'
###   @3='2009:01:01'
```

Specify `--verbose` or `-v` twice to also display data types and some metadata for each column, and informational log events such as row query log events if the `binlog_rows_query_log_events` system variable is set to `TRUE`. The output contains an additional comment following each column change:

```
$> mysqlbinlog -vv log_file
...
# at 218
#080828 15:03:08 server id 1  end_log_pos 258    Write_rows: table id 17 flags: STMT_END_F

BINLOG '
fAS3SBMBAAAALAAAANoAAAAABAAAAAAAABHRlc3QAXQAAwMPCgIUAAQ=
fAS3SBcBAAAAGAAAAIBAAAQABAAAAAAEAA//8AQAAAAvhcHBsZQ==
'/*!*/;
### INSERT INTO test.t
### SET
###   @1=1 /* INT meta=0 nullable=0 is_null=0 */
###   @2='apple' /* VARSTRING(20) meta=20 nullable=0 is_null=0 */
```

```
###  @3=NULL /* VARSTRING(20) meta=0 nullable=1 is_null=1 */
...
# at 302
#080828 15:03:08 server id 1  end_log_pos 356    Update_rows: table id 17 flags: STMT_END_F
BINLOG '
fAS3SBMBAAAALAAAAC4BAAAAABEAAAAAAAABHRLc3QAXQAAwMPCgIUAAQ=
fAS3SBgBAAAANgAAAGQBAAQABEAAAAAAEAA///AEAAAAYXBwbGX4AQAAAARwZWFFyIbIP
'/*!*/
### UPDATE test.t
### WHERE
###   @1=1 /* INT meta=0 nullable=0 is_null=0 */
###   @2='apple' /* VARSTRING(20) meta=20 nullable=0 is_null=0 */
###   @3=NULL /* VARSTRING(20) meta=0 nullable=1 is_null=1 */
### SET
###   @1=1 /* INT meta=0 nullable=0 is_null=0 */
###   @2='pear' /* VARSTRING(20) meta=20 nullable=0 is_null=0 */
###   @3='2009:01:01' /* DATE meta=0 nullable=1 is_null=0 */
...
# at 400
#080828 15:03:08 server id 1  end_log_pos 442    Delete_rows: table id 17 flags: STMT_END_F
BINLOG '
fAS3SBMBAAAALAAAABAAAABEAAAAAAAABHRLc3QAXQAAwMPCgIUAAQ=
fAS3SBkBAAAAKgAAALoBAAAQABEAAAAAAEAA//4AQAAAARwZWFFyIbIP
'/*!*/
### DELETE FROM test.t
### WHERE
###   @1=1 /* INT meta=0 nullable=0 is_null=0 */
###   @2='pear' /* VARSTRING(20) meta=20 nullable=0 is_null=0 */
###   @3='2009:01:01' /* DATE meta=0 nullable=1 is_null=0 */
```

You can tell `mysqlbinlog` to suppress the `BINLOG` statements for row events by using the `--base64-output=DECODE-ROWS` option. This is similar to `--base64-output=NEVER` but does not exit with an error if a row event is found. The combination of `--base64-output=DECODE-ROWS` and `--verbose` provides a convenient way to see row events only as SQL statements:

```
$> mysqlbinlog -v --base64-output=DECODE-ROWS log_file
...
# at 218
#080828 15:03:08 server id 1  end_log_pos 258    Write_rows: table id 17 flags: STMT_END_F
### INSERT INTO test.t
### SET
###   @1=1
###   @2='apple'
###   @3=NULL
...
# at 302
#080828 15:03:08 server id 1  end_log_pos 356    Update_rows: table id 17 flags: STMT_END_F
### UPDATE test.t
### WHERE
###   @1=1
###   @2='apple'
###   @3=NULL
### SET
###   @1=1
###   @2='pear'
###   @3='2009:01:01'
...
# at 400
#080828 15:03:08 server id 1  end_log_pos 442    Delete_rows: table id 17 flags: STMT_END_F
### DELETE FROM test.t
### WHERE
###   @1=1
###   @2='pear'
###   @3='2009:01:01'
```



### Note

You should not suppress `BINLOG` statements if you intend to re-execute `mysqlbinlog` output.

The SQL statements produced by `--verbose` for row events are much more readable than the corresponding `BINLOG` statements. However, they do not correspond exactly to the original SQL statements that generated the events. The following limitations apply:

- The original column names are lost and replaced by `@N`, where `N` is a column number.
- Character set information is not available in the binary log, which affects string column display:
  - There is no distinction made between corresponding binary and nonbinary string types (`BINARY` and `CHAR`, `VARBINARY` and `VARCHAR`, `BLOB` and `TEXT`). The output uses a data type of `STRING` for fixed-length strings and `VARSTRING` for variable-length strings.
  - For multibyte character sets, the maximum number of bytes per character is not present in the binary log, so the length for string types is displayed in bytes rather than in characters. For example, `STRING(4)` is used as the data type for values from either of these column types:

```
CHAR(4) CHARACTER SET latin1
CHAR(2) CHARACTER SET ucs2
```

- Due to the storage format for events of type `UPDATE_ROWS_EVENT`, `UPDATE` statements are displayed with the `WHERE` clause preceding the `SET` clause.

Proper interpretation of row events requires the information from the format description event at the beginning of the binary log. Because `mysqlbinlog` does not know in advance whether the rest of the log contains row events, by default it displays the format description event using a `BINLOG` statement in the initial part of the output.

If the binary log is known not to contain any events requiring a `BINLOG` statement (that is, no row events), the `--base64-output=NEVER` option can be used to prevent this header from being written.

#### 4.6.9.3 Using mysqlbinlog to Back Up Binary Log Files

By default, `mysqlbinlog` reads binary log files and displays their contents in text format. This enables you to examine events within the files more easily and to re-execute them (for example, by using the output as input to `mysql`). `mysqlbinlog` can read log files directly from the local file system, or, with the `--read-from-remote-server` option, it can connect to a server and request binary log contents from that server. `mysqlbinlog` writes text output to its standard output, or to the file named as the value of the `--result-file=file_name` option if that option is given.

- [mysqlbinlog Backup Capabilities](#)
- [mysqlbinlog Backup Options](#)
- [Static and Live Backups](#)
- [Output File Naming](#)
- [Example: mysqldump + mysqlbinlog for Backup and Restore](#)
- [mysqlbinlog Backup Restrictions](#)

##### mysqlbinlog Backup Capabilities

`mysqlbinlog` can read binary log files and write new files containing the same content—that is, in binary format rather than text format. This capability enables you to easily back up a binary log in its original format. `mysqlbinlog` can make a static backup, backing up a set of log files and stopping when the end of the last file is reached. It can also make a continuous (“live”) backup, staying connected to the server when it reaches the end of the last log file and continuing to copy new events as they are generated. In continuous-backup operation, `mysqlbinlog` runs until the connection ends (for example, when the server exits) or `mysqlbinlog` is forcibly terminated. When the connection ends, `mysqlbinlog` does not wait and retry the connection, unlike a replica server. To continue a live backup after the server has been restarted, you must also restart `mysqlbinlog`.

**Important**

`mysqlbinlog` can back up both encrypted and unencrypted binary log files. However, copies of encrypted binary log files that are generated using `mysqlbinlog` are stored in an unencrypted format.

**mysqlbinlog Backup Options**

Binary log backup requires that you invoke `mysqlbinlog` with two options at minimum:

- The `--read-from-remote-server` (or `-R`) option tells `mysqlbinlog` to connect to a server and request its binary log. (This is similar to a replica server connecting to its replication source server.)
- The `--raw` option tells `mysqlbinlog` to write raw (binary) output, not text output.

Along with `--read-from-remote-server`, it is common to specify other options: `--host` indicates where the server is running, and you may also need to specify connection options such as `--user` and `--password`.

Several other options are useful in conjunction with `--raw`:

- `--stop-never`: Stay connected to the server after reaching the end of the last log file and continue to read new events.
- `--connection-server-id=id`: The server ID that `mysqlbinlog` reports when it connects to a server. When `--stop-never` is used, the default reported server ID is 1. If this causes a conflict with the ID of a replica server or another `mysqlbinlog` process, use `--connection-server-id` to specify an alternative server ID. See [Section 4.6.9.4, “Specifying the mysqlbinlog Server ID”](#).
- `--result-file`: A prefix for output file names, as described later.

**Static and Live Backups**

To back up a server's binary log files with `mysqlbinlog`, you must specify file names that actually exist on the server. If you do not know the names, connect to the server and use the `SHOW BINARY LOGS` statement to see the current names. Suppose that the statement produces this output:

```
mysql> SHOW BINARY LOGS;
+-----+-----+-----+
| Log_name      | File_size | Encrypted |
+-----+-----+-----+
binlog.000130	27459	No
binlog.000131	13719	No
binlog.000132	43268	No
+-----+-----+-----+
```

With that information, you can use `mysqlbinlog` to back up the binary log to the current directory as follows (enter each command on a single line):

- To make a static backup of `binlog.000130` through `binlog.000132`, use either of these commands:

```
mysqlbinlog --read-from-remote-server --host=host_name --raw
            binlog.000130 binlog.000131 binlog.000132

mysqlbinlog --read-from-remote-server --host=host_name --raw
            --to-last-log binlog.000130
```

The first command specifies every file name explicitly. The second names only the first file and uses `--to-last-log` to read through the last. A difference between these commands is that if the server happens to open `binlog.000133` before `mysqlbinlog` reaches the end of `binlog.000132`, the first command does not read it, but the second command does.

- To make a live backup in which `mysqlbinlog` starts with `binlog.000130` to copy existing log files, then stays connected to copy new events as the server generates them:

```
mysqlbinlog --read-from-remote-server --host=host_name --raw
--stop-never binlog.000130
```

With `--stop-never`, it is not necessary to specify `--to-last-log` to read to the last log file because that option is implied.

## Output File Naming

Without `--raw`, `mysqlbinlog` produces text output and the `--result-file` option, if given, specifies the name of the single file to which all output is written. With `--raw`, `mysqlbinlog` writes one binary output file for each log file transferred from the server. By default, `mysqlbinlog` writes the files in the current directory with the same names as the original log files. To modify the output file names, use the `--result-file` option. In conjunction with `--raw`, the `--result-file` option value is treated as a prefix that modifies the output file names.

Suppose that a server currently has binary log files named `binlog.000999` and up. If you use `mysqlbinlog --raw` to back up the files, the `--result-file` option produces output file names as shown in the following table. You can write the files to a specific directory by beginning the `--result-file` value with the directory path. If the `--result-file` value consists only of a directory name, the value must end with the pathname separator character. Output files are overwritten if they exist.

| <code>--result-file</code> Option | Output File Names                       |
|-----------------------------------|-----------------------------------------|
| <code>--result-file=x</code>      | <code>xbinlog.000999</code> and up      |
| <code>--result-file=/tmp/</code>  | <code>/tmp/binlog.000999</code> and up  |
| <code>--result-file=/tmp/x</code> | <code>/tmp/xbinlog.000999</code> and up |

## Example: mysqldump + mysqlbinlog for Backup and Restore

The following example describes a simple scenario that shows how to use `mysqldump` and `mysqlbinlog` together to back up a server's data and binary log, and how to use the backup to restore the server if data loss occurs. The example assumes that the server is running on host `host_name` and its first binary log file is named `binlog.000999`. Enter each command on a single line.

Use `mysqlbinlog` to make a continuous backup of the binary log:

```
mysqlbinlog --read-from-remote-server --host=host_name --raw
--stop-never binlog.000999
```

Use `mysqldump` to create a dump file as a snapshot of the server's data. Use `--all-databases`, `--events`, and `--routines` to back up all data, and `--master-data=2` to include the current binary log coordinates in the dump file.

```
mysqldump --host=host_name --all-databases --events --routines --master-data=2> dump_file
```

Execute the `mysqldump` command periodically to create newer snapshots as desired.

If data loss occurs (for example, if the server unexpectedly exits), use the most recent dump file to restore the data:

```
mysql --host=host_name -u root -p < dump_file
```

Then use the binary log backup to re-execute events that were written after the coordinates listed in the dump file. Suppose that the coordinates in the file look like this:

```
-- CHANGE MASTER TO MASTER_LOG_FILE='binlog.001002', MASTER_LOG_POS=27284;
```

If the most recent backed-up log file is named `binlog.001004`, re-execute the log events like this:

```
mysqlbinlog --start-position=27284 binlog.001002 binlog.001003 binlog.001004
| mysql --host=host_name -u root -p
```

You might find it easier to copy the backup files (dump file and binary log files) to the server host to make it easier to perform the restore operation, or if MySQL does not allow remote `root` access.

## mysqlbinlog Backup Restrictions

Binary log backups with `mysqlbinlog` are subject to these restrictions:

- `mysqlbinlog` does not automatically reconnect to the MySQL server if the connection is lost (for example, if a server restart occurs or there is a network outage).
- The delay for a backup is similar to the delay for a replica server.

### 4.6.9.4 Specifying the mysqlbinlog Server ID

When invoked with the `--read-from-remote-server` option, `mysqlbinlog` connects to a MySQL server, specifies a server ID to identify itself, and requests binary log files from the server. You can use `mysqlbinlog` to request log files from a server in several ways:

- Specify an explicitly named set of files: For each file, `mysqlbinlog` connects and issues a `Binlog dump` command. The server sends the file and disconnects. There is one connection per file.
- Specify the beginning file and `--to-last-log`: `mysqlbinlog` connects and issues a `Binlog dump` command for all files. The server sends all files and disconnects.
- Specify the beginning file and `--stop-never` (which implies `--to-last-log`): `mysqlbinlog` connects and issues a `Binlog dump` command for all files. The server sends all files, but does not disconnect after sending the last one.

With `--read-from-remote-server` only, `mysqlbinlog` connects using a server ID of 0, which tells the server to disconnect after sending the last requested log file.

With `--read-from-remote-server` and `--stop-never`, `mysqlbinlog` connects using a nonzero server ID, so the server does not disconnect after sending the last log file. The server ID is 1 by default, but this can be changed with `--connection-server-id`.

Thus, for the first two ways of requesting files, the server disconnects because `mysqlbinlog` specifies a server ID of 0. It does not disconnect if `--stop-never` is given because `mysqlbinlog` specifies a nonzero server ID.

## 4.6.10 mysqldumpslow — Summarize Slow Query Log Files

The MySQL slow query log contains information about queries that take a long time to execute (see [Section 5.4.5, “The Slow Query Log”](#)). `mysqldumpslow` parses MySQL slow query log files and summarizes their contents.

Normally, `mysqldumpslow` groups queries that are similar except for the particular values of number and string data values. It “abstracts” these values to `N` and `'S'` when displaying summary output. To modify value abstracting behavior, use the `-a` and `-n` options.

Invoke `mysqldumpslow` like this:

```
mysqldumpslow [options] [log_file ...]
```

Example output with no options given:

```
Reading mysql slow query log from /usr/local/mysql/data/mysqld80-slow.log
Count: 1 Time=4.32s (4s) Lock=0.00s (0s) Rows=0.0 (0), root[root]@localhost
insert into t2 select * from t1

Count: 3 Time=2.53s (7s) Lock=0.00s (0s) Rows=0.0 (0), root[root]@localhost
insert into t2 select * from t1 limit N

Count: 3 Time=2.13s (6s) Lock=0.00s (0s) Rows=0.0 (0), root[root]@localhost
insert into t1 select * from t1
```

`mysqldumpslow` supports the following options.

**Table 4.23 mysqldumpslow Options**

| Option Name            | Description                                         |
|------------------------|-----------------------------------------------------|
| <code>-a</code>        | Do not abstract all numbers to N and strings to 'S' |
| <code>-n</code>        | Abstract numbers with at least the specified digits |
| <code>--debug</code>   | Write debugging information                         |
| <code>-g</code>        | Only consider statements that match the pattern     |
| <code>--help</code>    | Display help message and exit                       |
| <code>-h</code>        | Host name of the server in the log file name        |
| <code>-i</code>        | Name of the server instance                         |
| <code>-l</code>        | Do not subtract lock time from total time           |
| <code>-r</code>        | Reverse the sort order                              |
| <code>-s</code>        | How to sort output                                  |
| <code>-t</code>        | Display only first num queries                      |
| <code>--verbose</code> | Verbose mode                                        |

- `--help`

Display a help message and exit.

- `-a`

Do not abstract all numbers to `N` and strings to '`S`'.

- `--debug, -d`

Run in debug mode.

This option is available only if MySQL was built using `WITH_DEBUG`. MySQL release binaries provided by Oracle are *not* built using this option.

- `-g pattern`

Consider only queries that match the (`grep`-style) pattern.

- `-h host_name`

Host name of MySQL server for `*-slow.log` file name. The value can contain a wildcard. The default is `*` (match all).

- `-i name`

Name of server instance (if using `mysql.server` startup script).

- `-l`

Do not subtract lock time from total time.

- `-n N`

Abstract numbers with at least `N` digits within names.

- `-r`

Reverse the sort order.

- `-s sort_type`

How to sort the output. The value of `sort_type` should be chosen from the following list:

- `t, at`: Sort by query time or average query time
- `l, al`: Sort by lock time or average lock time
- `r, ar`: Sort by rows sent or average rows sent
- `c`: Sort by count

By default, `mysqldumpslow` sorts by average query time (equivalent to `-s at`).

- `-t N`

Display only the first `N` queries in the output.

- `--verbose, -v`

Verbose mode. Print more information about what the program does.

## 4.7 Program Development Utilities

This section describes some utilities that you may find useful when developing MySQL programs.

In shell scripts, you can use the `my_print_defaults` program to parse option files and see what options would be used by a given program. The following example shows the output that `my_print_defaults` might produce when asked to show the options found in the `[client]` and `[mysql]` groups:

```
$> my_print_defaults client mysql
--port=3306
--socket=/tmp/mysql.sock
--no-auto-rehash
```

Note for developers: Option file handling is implemented in the C client library simply by processing all options in the appropriate group or groups before any command-line arguments. This works well for programs that use the last instance of an option that is specified multiple times. If you have a C or C++ program that handles multiply specified options this way but that doesn't read option files, you need add only two lines to give it that capability. Check the source code of any of the standard MySQL clients to see how to do this.

Several other language interfaces to MySQL are based on the C client library, and some of them provide a way to access option file contents. These include Perl and Python. For details, see the documentation for your preferred interface.

### 4.7.1 mysql\_config — Display Options for Compiling Clients

`mysql_config` provides you with useful information for compiling your MySQL client and connecting it to MySQL. It is a shell script, so it is available only on Unix and Unix-like systems.



#### Note

`pkg-config` can be used as an alternative to `mysql_config` for obtaining information such as compiler flags or link libraries required to compile MySQL applications. For more information, see [Building C API Client Programs Using pkg-config](#).

`mysql_config` supports the following options.

- `--cflags`

C Compiler flags to find include files and critical compiler flags and defines used when compiling the `libmysqlclient` library. The options returned are tied to the specific compiler that was used when the library was created and might clash with the settings for your own compiler. Use `--include` for more portable options that contain only include paths.

- `--cxxflags`

Like `--cflags`, but for C++ compiler flags.

- `--include`

Compiler options to find MySQL include files.

- `--libs`

Libraries and options required to link with the MySQL client library.

- `--libs_r`

Libraries and options required to link with the thread-safe MySQL client library. In MySQL 8.0, all client libraries are thread-safe, so this option need not be used. The `--libs` option can be used in all cases.

- `--plugindir`

The default plugin directory path name, defined when configuring MySQL.

- `--port`

The default TCP/IP port number, defined when configuring MySQL.

- `--socket`

The default Unix socket file, defined when configuring MySQL.

- `--variable=var_name`

Display the value of the named configuration variable. Permitted `var_name` values are `pkgincludedir` (the header file directory), `pkglibdir` (the library directory), and `plugindir` (the plugin directory).

- `--version`

Version number for the MySQL distribution.

If you invoke `mysql_config` with no options, it displays a list of all options that it supports, and their values:

```
$> mysql_config
Usage: /usr/local/mysql/bin/mysql_config [options]
Options:
  --cflags           [-I/usr/local/mysql/include/mysql -mcpu=pentiumpro]
  --cxxflags         [-I/usr/local/mysql/include/mysql -mcpu=pentiumpro]
  --include          [-I/usr/local/mysql/include/mysql]
  --libs             [-L/usr/local/mysql/lib/mysql -lmysqlclient
                     -lpthread -lm -lrt -lssl -lcrypto -ldl]
  --libs_r           [-L/usr/local/mysql/lib/mysql -lmysqlclient_r
                     -lpthread -lm -lrt -lssl -lcrypto -ldl]
  --plugindir        [/usr/local/mysql/lib/plugin]
  --socket           [/tmp/mysql.sock]
  --port             [3306]
  --version          [5.8.0-m17]
  --variable=VAR     VAR is one of:
                    pkgincludedir [/usr/local/mysql/include]
                    pkglibdir    [/usr/local/mysql/lib]
                    plugindir   [/usr/local/mysql/lib/plugin]
```

You can use `mysql_config` within a command line using backticks to include the output that it produces for particular options. For example, to compile and link a MySQL client program, use `mysql_config` as follows:

```
gcc -c `mysql_config --cflags` programe.c  
gcc -o programe programe.o `mysql_config --libs`
```

## 4.7.2 my\_print\_defaults — Display Options from Option Files

`my_print_defaults` displays the options that are present in option groups of option files. The output indicates what options are used by programs that read the specified option groups. For example, the `mysqlcheck` program reads the `[mysqlcheck]` and `[client]` option groups. To see what options are present in those groups in the standard option files, invoke `my_print_defaults` like this:

```
$> my_print_defaults mysqlcheck client  
--user=myusername  
--password=password  
--host=localhost
```

The output consists of options, one per line, in the form that they would be specified on the command line.

`my_print_defaults` supports the following options.

- `--help, -?`

Display a help message and exit.

- `--config-file=file_name, --defaults-file=file_name, -c file_name`

Read only the given option file.

- `--debug=debug_options, -# debug_options`

Write a debugging log. A typical `debug_options` string is `d:t:o,file_name`. The default is `d:t:o,/tmp/my_print_defaults.trace`.

- `--defaults-extra-file=file_name, --extra-file=file_name, -e file_name`

Read this option file after the global option file but (on Unix) before the user option 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”](#).

- `--defaults-group-suffix=suffix, -g suffix`

In addition to the groups named on the command line, read groups that have the given suffix.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--login-path=name, -l name`

Read options from the named login path in the `.mylogin.cnf` login path file. A “login path” is an option group containing options that specify which MySQL server to connect to and which account to authenticate as. To create or modify a login path file, use the `mysql_config_editor` utility. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- `--no-defaults, -n`

Return an empty string.

For additional information about this and other option-file options, see [Section 4.2.2.3, “Command-Line Options that Affect Option-File Handling”](#).

- **--show, -s**  
`my_print_defaults` masks passwords by default. Use this option to display passwords as cleartext.
- **--verbose, -v**  
 Verbose mode. Print more information about what the program does.
- **--version, -V**  
 Display version information and exit.

## 4.8 Miscellaneous Programs

### 4.8.1 lz4\_decompress — Decompress mysqlpump LZ4-Compressed Output

The `lz4_decompress` utility decompresses `mysqlpump` output that was created using LZ4 compression.



#### Note

If MySQL was configured with the `-DWITH_LZ4=system` option, `lz4_decompress` is not built. In this case, the system `lz4` command can be used instead.

Invoke `lz4_decompress` like this:

```
lz4_decompress input_file output_file
```

Example:

```
mysqlpump --compress-output=LZ4 > dump.lz4
lz4_decompress dump.lz4 dump.txt
```

To see a help message, invoke `lz4_decompress` with no arguments.

To decompress `mysqlpump` ZLIB-compressed output, use `zlib_decompress`. See [Section 4.8.3, “zlib\\_decompress — Decompress mysqlpump ZLIB-Compressed Output”](#).

### 4.8.2 perror — Display MySQL Error Message Information

`perror` displays the error message for MySQL or operating system error codes. Invoke `perror` like this:

```
perror [options] errorcode ...
```

`perror` attempts to be flexible in understanding its arguments. For example, for the `ER_WRONG_VALUE_FOR_VAR` error, `perror` understands any of these arguments: `1231`, `001231`, `MY-1231`, or `MY-001231`, or `ER_WRONG_VALUE_FOR_VAR`.

```
$> perror 1231
MySQL error code MY-001231 (ER_WRONG_VALUE_FOR_VAR): Variable '%-.64s'
can't be set to the value of '%-.200s'
```

If an error number is in the range where MySQL and operating system errors overlap, `perror` displays both error messages:

```
$> perror 1 13
OS error code   1: Operation not permitted
MySQL error code MY-000001: Can't create/write to file '%s' (OS errno %d - %s)
```

```
OS error code 13: Permission denied
MySQL error code MY-000013: Can't get stat of '%s' (OS errno %d - %s)
```

To obtain the error message for a MySQL Cluster error code, use the `ndb_perror` utility.

The meaning of system error messages may be dependent on your operating system. A given error code may mean different things on different operating systems.

`perror` supports the following options.

- `--help`, `--info`, `-I`, `-?`

Display a help message and exit.

- `--ndb`

Print the error message for a MySQL Cluster error code.

This option was removed in MySQL 8.0.13. Use the `ndb_perror` utility instead.

- `--silent`, `-s`

Silent mode. Print only the error message.

- `--verbose`, `-v`

Verbose mode. Print error code and message. This is the default behavior.

- `--version`, `-V`

Display version information and exit.

### 4.8.3 `zlib_decompress` — Decompress mysqlpump ZLIB-Compressed Output

The `zlib_decompress` utility decompresses `mysqlpump` output that was created using ZLIB compression.



#### Note

If MySQL was configured with the `-DWITH_ZLIB=system` option, `zlib_decompress` is not built. In this case, the system `openssl zlib` command can be used instead.

Invoke `zlib_decompress` like this:

```
zlib_decompress input_file output_file
```

Example:

```
mysqlpump --compress-output=ZLIB > dump.zlib
zlib_decompress dump.zlib dump.txt
```

To see a help message, invoke `zlib_decompress` with no arguments.

To decompress `mysqlpump` LZ4-compressed output, use `lz4_decompress`. See [Section 4.8.1, “`lz4\_decompress` — Decompress mysqlpump LZ4-Compressed Output”](#).

## 4.9 Environment Variables

This section lists environment variables that are used directly or indirectly by MySQL. Most of these can also be found in other places in this manual.

Options on the command line take precedence over values specified in option files and environment variables, and values in option files take precedence over values in environment variables. In many

cases, it is preferable to use an option file instead of environment variables to modify the behavior of MySQL. See [Section 4.2.2.2, “Using Option Files”](#).

| Variable                             | Description                                                                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AUTHENTICATION_KERBEROS_CLIENT_LOG   | Kerberos authentication logging level.                                                                                                                                  |
| AUTHENTICATION_LDAP_CLIENT_LOG       | Client-side LDAP authentication logging level.                                                                                                                          |
| AUTHENTICATION_PAM_LOG               | PAM authentication plugin debug logging settings.                                                                                                                       |
| CC                                   | The name of your C compiler (for running <a href="#">CMake</a> ).                                                                                                       |
| CXX                                  | The name of your C++ compiler (for running <a href="#">CMake</a> ).                                                                                                     |
| CC                                   | The name of your C compiler (for running <a href="#">CMake</a> ).                                                                                                       |
| DBI_USER                             | The default user name for Perl DBI.                                                                                                                                     |
| DBI_TRACE                            | Trace options for Perl DBI.                                                                                                                                             |
| HOME                                 | The default path for the <code>mysql</code> history file is <code>\$HOME/.mysql_history</code> .                                                                        |
| LD_RUN_PATH                          | Used to specify the location of <code>libmysqlclient.so</code> .                                                                                                        |
| LIBMYSQL_ENABLE_CLEARTEXT_PLUGIN     | Enable <code>mysql_clear_password</code> authentication plugin; see <a href="#">Section 6.4.1.4, “Client-Side Cleartext Pluggable Authentication”</a> .                 |
| LIBMYSQL_PLUGIN_DIR                  | Directory in which to look for client plugins.                                                                                                                          |
| LIBMYSQL_PLUGINS                     | Client plugins to preload.                                                                                                                                              |
| MYSQL_DEBUG                          | Debug trace options when debugging.                                                                                                                                     |
| MYSQL_GROUP_SUFFIX                   | Option group suffix value (like specifying <code>--defaults-group-suffix</code> ).                                                                                      |
| MYSQL_HISTFILE                       | The path to the <code>mysql</code> history file. If this variable is set, its value overrides the default for <code>\$HOME/.mysql_history</code> .                      |
| MYSQL_HISTIGNORE                     | Patterns specifying statements that <code>mysql</code> should not log to <code>\$HOME/.mysql_history</code> , or <code>syslog</code> if <code>--syslog</code> is given. |
| MYSQL_HOME                           | The path to the directory in which the server-specific <code>my.cnf</code> file resides.                                                                                |
| MYSQL_HOST                           | The default host name used by the <code>mysql</code> command-line client.                                                                                               |
| MYSQL_OPENSSL_UDF_DH_BITS_THRESHOLD  | Maximum key length for <code>create_dh_parameters()</code> . See <a href="#">Section 6.6.3, “MySQL Enterprise Encryption Usage and Examples”</a> .                      |
| MYSQL_OPENSSL_UDF_DSA_BITS_THRESHOLD | Maximum DSA key length for <code>create_asymmetric_priv_key()</code> . See <a href="#">Section 6.6.3, “MySQL Enterprise Encryption Usage and Examples”</a> .            |
| MYSQL_OPENSSL_UDF_RSA_BITS_THRESHOLD | Maximum RSA key length for <code>create_asymmetric_priv_key()</code> . See <a href="#">Section 6.6.3, “MySQL Enterprise Encryption Usage and Examples”</a> .            |
| MYSQL_PS1                            | The command prompt to use in the <code>mysql</code> command-line client.                                                                                                |

| Variable               | Description                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------------------|
| MYSQL_PWD              | The default password when connecting to <code>mysqld</code> . Using this is insecure. See note following table. |
| MYSQL_TCP_PORT         | The default TCP/IP port number.                                                                                 |
| MYSQL_TEST_LOGIN_FILE  | The name of the <code>.mylogin.cnf</code> login path file.                                                      |
| MYSQL_TEST_TRACE_CRASH | Whether the test protocol trace plugin crashes clients. See note following table.                               |
| MYSQL_TEST_TRACE_DEBUG | Whether the test protocol trace plugin produces output. See note following table.                               |
| MYSQL_UNIX_PORT        | The default Unix socket file name; used for connections to <code>localhost</code> .                             |
| MYSQLX_TCP_PORT        | The X Plugin default TCP/IP port number.                                                                        |
| MYSQLX_UNIX_PORT       | The X Plugin default Unix socket file name; used for connections to <code>localhost</code> .                    |
| NOTIFY_SOCKET          | Socket used by <code>mysqld</code> to communicate with <code>systemd</code> .                                   |
| PATH                   | Used by the shell to find MySQL programs.                                                                       |
| PKG_CONFIG_PATH        | Location of <code>mysqlclient.pc pkg-config</code> file. See note following table.                              |
| TMPDIR                 | The directory in which temporary files are created.                                                             |
| TZ                     | This should be set to your local time zone. See <a href="#">Section B.3.3.7, “Time Zone Problems”</a> .         |
| UMASK                  | The user-file creation mode when creating files. See note following table.                                      |
| UMASK_DIR              | The user-directory creation mode when creating directories. See note following table.                           |
| USER                   | The default user name on Windows when connecting to <code>mysqld</code> .                                       |

For information about the `mysql` history file, see [Section 4.5.1.3, “mysql Client Logging”](#).

Use of `MYSQL_PWD` to specify a MySQL password must be considered *extremely insecure* and should not be used. Some versions of `ps` include an option to display the environment of running processes. On some systems, if you set `MYSQL_PWD`, your password is exposed to any other user who runs `ps`. Even on systems without such a version of `ps`, it is unwise to assume that there are no other methods by which users can examine process environments.

`MYSQL_PWD` is deprecated as of MySQL 8.0; expect it to be removed in a future version of MySQL.

`MYSQL_TEST_LOGIN_FILE` is the path name of the login path file (the file created by `mysql_config_editor`). If not set, the default value is `%APPDATA%\MySQL\mylogin.cnf` directory on Windows and `$HOME/.mylogin.cnf` on non-Windows systems. See [Section 4.6.7, “mysql\\_config\\_editor — MySQL Configuration Utility”](#).

The `MYSQL_TEST_TRACE_DEBUG` and `MYSQL_TEST_TRACE_CRASH` variables control the test protocol trace client plugin, if MySQL is built with that plugin enabled. For more information, see [Using the Test Protocol Trace Plugin](#).

The default `UMASK` and `UMASK_DIR` values are `0640` and `0750`, respectively. MySQL assumes that the value for `UMASK` or `UMASK_DIR` is in octal if it starts with a zero. For example, setting `UMASK=0600` is equivalent to `UMASK=384` because `0600` octal is `384` decimal.

The `UMASK` and `UMASK_DIR` variables, despite their names, are used as modes, not masks:

- If `UMASK` is set, `mysqld` uses `($UMASK | 0600)` as the mode for file creation, so that newly created files have a mode in the range from 0600 to 0666 (all values octal).
- If `UMASK_DIR` is set, `mysqld` uses `($UMASK_DIR | 0700)` as the base mode for directory creation, which then is AND-ed with `~(~$UMASK & 0666)`, so that newly created directories have a mode in the range from 0700 to 0777 (all values octal). The AND operation may remove read and write permissions from the directory mode, but not execute permissions.

See also [Section B.3.3.1, “Problems with File Permissions”](#).

It may be necessary to set `PKG_CONFIG_PATH` if you use `pkg-config` for building MySQL programs. See [Building C API Client Programs Using pkg-config](#).

## 4.10 Unix Signal Handling in MySQL

On Unix and Unix-like systems, a process can be the recipient of signals sent to it by the `root` system account or the system account that owns the process. Signals can be sent using the `kill` command. Some command interpreters associate certain key sequences with signals, such as **Control+C** to send a `SIGINT` signal. This section describes how the MySQL server and client programs respond to signals.

- [Server Response to Signals](#)
- [Client Response to Signals](#)

### Server Response to Signals

`mysqld` responds to signals as follows:

- `SIGTERM` causes the server to shut down. This is like executing a `SHUTDOWN` statement without having to connect to the server (which for shutdown requires an account that has the `SHUTDOWN` privilege).
- `SIGHUP` causes the server to reload the grant tables and to flush tables, logs, the thread cache, and the host cache. These actions are like various forms of the `FLUSH` statement. Sending the signal enables the flush operations to be performed without having to connect to the server, which requires a MySQL account that has privileges sufficient for those operations. Prior to MySQL 8.0.20, the server also writes a status report to the error log that has this format:

```
Status information:

Current dir: /var/mysql/data/
Running threads: 4  Stack size: 262144
Current locks:
lock: 0x7f742c02c0e0:
lock: 0x2cee2a20:
:
lock: 0x207a080:

Key caches:
default
Buffer_size:      8388608
Block_size:       1024
Division_limit:   100
Age_limit:        300
blocks used:      4
not flushed:      0
w_requests:       0
writes:            0
r_requests:       8
reads:             4

handler status:
read_key:          13
read_next:         4
```

```

read_rnd          0
read_first:      13
write:           1
delete:          0
update:          0

Table status:
Opened tables:   121
Open tables:     114
Open files:      18
Open streams:    0

Memory status:
<malloc version="1">
<heap nr="0">
<sizes>
  <size from="17" to="32" total="32" count="1"/>
  <size from="33" to="48" total="96" count="2"/>
  <size from="33" to="33" total="33" count="1"/>
  <size from="97" to="97" total="6014" count="62"/>
  <size from="113" to="113" total="904" count="8"/>
  <size from="193" to="193" total="193" count="1"/>
  <size from="241" to="241" total="241" count="1"/>
  <size from="609" to="609" total="609" count="1"/>
  <size from="16369" to="16369" total="49107" count="3"/>
  <size from="24529" to="24529" total="98116" count="4"/>
  <size from="32689" to="32689" total="32689" count="1"/>
  <unsorted from="241" to="7505" total="7746" count="2"/>
</sizes>
<total type="fast" count="3" size="128"/>
<total type="rest" count="84" size="195652"/>
<system type="current" size="690774016"/>
<system type="max" size="690774016"/>
<aspace type="total" size="690774016"/>
<aspace type="mprotect" size="690774016"/>
</heap>
:
<total type="fast" count="85" size="5520"/>
<total type="rest" count="116" size="316820"/>
<total type="mmap" count="82" size="939954176"/>
<system type="current" size="695717888"/>
<system type="max" size="695717888"/>
<aspace type="total" size="695717888"/>
<aspace type="mprotect" size="695717888"/>
</malloc>

Events status:
LLA = Last Locked At LUA = Last Unlocked At
WOC = Waiting On Condition DL = Data Locked

Event scheduler status:
State       : INITIALIZED
Thread id  : 0
LLA        : n/a:0
LUA        : n/a:0
WOC        : NO
Workers    : 0
Executed   : 0
Data locked: NO

Event queue status:
Element count : 0
Data locked   : NO
Attempting lock : NO
LLA           : init_queue:95
LUA           : init_queue:103
WOC           : NO
Next activation : never

```

- As of MySQL 8.0.19, `SIGUSR1` causes the server to flush the error log, general query log, and slow query log. One use for `SIGUSR1` is to implement log rotation without having to connect to the server,

which requires a MySQL account that has privileges sufficient for those operations. For information about log rotation, see [Section 5.4.6, “Server Log Maintenance”](#).

The server response to `SIGUSR1` is a subset of the response to `SIGHUP`, enabling `SIGUSR1` to be used as a more “lightweight” signal that flushes certain logs without the other `SIGHUP` effects such as flushing the thread and host caches and writing a status report to the error log.

- `SIGINT` normally is ignored by the server. Starting the server with the `--gdb` option installs an interrupt handler for `SIGINT` for debugging purposes. See [Section 5.9.1.4, “Debugging mysqld under gdb”](#).

## Client Response to Signals

MySQL client programs respond to signals as follows:

- The `mysql` client interprets `SIGINT` (typically the result of typing **Control+C**) as instruction to interrupt the current statement if there is one, or to cancel any partial input line otherwise. This behavior can be disabled using the `--sigint-ignore` option to ignore `SIGINT` signals.
- Client programs that use the MySQL client library block `SIGPIPE` signals by default. These variations are possible:
  - Client can install their own `SIGPIPE` handler to override the default behavior. See [Writing C API Threaded Client Programs](#).
  - Clients can prevent installation of `SIGPIPE` handlers by specifying the `CLIENT_IGNORE_SIGPIPE` option to `mysql_real_connect()` at connect time. See [mysql\\_real\\_connect\(\)](#).

---

# Chapter 5 MySQL Server Administration

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MySQL Server (`mysqld`) is the main program that does most of the work in a MySQL installation. This chapter provides an overview of MySQL Server and covers general server administration:

- Server configuration
- The data directory, particularly the `mysql` system schema
- The server log files
- Management of multiple servers on a single machine

For additional information on administrative topics, see also:

- [Chapter 6, Security](#)
- [Chapter 7, Backup and Recovery](#)
- [Chapter 17, Replication](#)

## 5.1 The MySQL Server

`mysqld` is the MySQL server. The following discussion covers these MySQL server configuration topics:

- Startup options that the server supports. You can specify these options on the command line, through configuration files, or both.
- Server system variables. These variables reflect the current state and values of the startup options, some of which can be modified while the server is running.
- Server status variables. These variables contain counters and statistics about runtime operation.
- How to set the server SQL mode. This setting modifies certain aspects of SQL syntax and semantics, for example for compatibility with code from other database systems, or to control the error handling for particular situations.
- How the server manages client connections.
- Configuring and using IPv6 and network namespace support.
- Configuring and using time zone support.
- Using resource groups.
- Server-side help capabilities.
- Capabilities provided to enable client session state changes.
- The server shutdown process. There are performance and reliability considerations depending on the type of table (transactional or nontransactional) and whether you use replication.

For listings of MySQL server variables and options that have been added, deprecated, or removed in MySQL 8.0, see [Section 1.4, “Server and Status Variables and Options Added, Deprecated, or Removed in MySQL 8.0”](#).



### Note

Not all storage engines are supported by all MySQL server binaries and configurations. To find out how to determine which storage engines your

MySQL server installation supports, see [Section 13.7.7.16, “SHOW ENGINES Statement”](#).

## 5.1.1 Configuring the Server

The MySQL server, `mysqld`, has many command options and system variables that can be set at startup to configure its operation. To determine the default command option and system variable values used by the server, execute this command:

```
$> mysqld --verbose --help
```

The command produces a list of all `mysqld` options and configurable system variables. Its output includes the default option and variable values and looks something like this:

|                                  |                          |
|----------------------------------|--------------------------|
| 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                    |

To see the current system variable values actually used by the server as it runs, connect to it and execute this statement:

```
mysql> SHOW VARIABLES;
```

To see some statistical and status indicators for a running server, execute this statement:

```
mysql> SHOW STATUS;
```

System variable and status information also is available using the `mysqladmin` command:

```
$> mysqladmin variables
$> mysqladmin extended-status
```

For a full description of all command options, system variables, and status variables, see these sections:

- [Section 5.1.7, “Server Command Options”](#)
- [Section 5.1.8, “Server System Variables”](#)
- [Section 5.1.10, “Server Status Variables”](#)

More detailed monitoring information is available from the Performance Schema; see [Chapter 27, MySQL Performance Schema](#). In addition, the MySQL `sys` schema is a set of objects that provides convenient access to data collected by the Performance Schema; see [Chapter 28, MySQL sys Schema](#).

If you specify an option on the command line for `mysqld` or `mysqld_safe`, it remains in effect only for that invocation of the server. To use the option every time the server runs, put it in an option file. See [Section 4.2.2.2, “Using Option Files”](#).

## 5.1.2 Server Configuration Defaults

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”](#), and [Section 5.1.8, “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”](#). Without an option file, the server just starts with its default settings—see [Section 5.1.2, “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”](#).

## 5.1.3 Server Configuration Validation

As of MySQL 8.0.16, MySQL Server supports a `--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:

```
$> 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` again.

For the preceding example, where use of `--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` 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:

```
$> 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:

```
$> 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` 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` 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` to check the configuration produces this result:

```
$> 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` can be used with the `--defaults-file` option to validate only the options in a specific file:

```
$> 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`, 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` itself is unknown.)

## 5.1.4 Server Option, System Variable, and Status Variable Reference

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 23.4.2.5, “NDB Cluster mysqld Option and Variable Reference”](#).

**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    | Yes      | Yes         |            |            |           |         |
| Aborted_clients            |          |             |            | Yes        | Global    | No      |
| Aborted_connects           |          |             |            | Yes        | Global    | No      |
| Acl_cache_items_count      |          |             |            | Yes        | Global    | No      |
| activate_all_roleson_login | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_address              | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                                | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-------------------------------------|----------|-------------|------------|------------|-----------|---------|
| admin_port                          | Yes      | Yes         | Yes        |            | Global    | No      |
| admin-ssl                           | Yes      | Yes         |            |            |           |         |
| admin_ssl_ca                        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_ssl_capath                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_ssl_cert                      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_ssl_cipher                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_ssl_crl                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_ssl_crlpath                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_ssl_key                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_tls_ciphersuites              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| admin_tls_versions                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| allow-suspicious-udfs               | Yes      | Yes         |            |            |           |         |
| ansi                                | Yes      | Yes         |            |            |           |         |
| audit-log                           | Yes      | Yes         |            |            |           |         |
| audit_log_buffer_size               | Yes      | Yes         | Yes        |            | Global    | No      |
| audit_log_compression               | Yes      | Yes         | Yes        |            | Global    | No      |
| audit_log_connection_policy         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_current_session           |          |             | Yes        |            | Both      | No      |
| Audit_log_current_size              |          |             |            | Yes        | Global    | No      |
| audit_log_disable                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_encrypt                   | Yes      | Yes         | Yes        |            | Global    | No      |
| Audit_log_event_max_drop_size       |          |             |            | Yes        | Global    | No      |
| Audit_log_events                    |          |             |            | Yes        | Global    | No      |
| Audit_log_events_filtered           |          |             |            | Yes        | Global    | No      |
| Audit_log_events_lost               |          |             |            | Yes        | Global    | No      |
| Audit_log_events_written            |          |             |            | Yes        | Global    | No      |
| audit_log_excluded_accounts         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_file                      | Yes      | Yes         | Yes        |            | Global    | No      |
| audit_log_filter_id                 |          |             | Yes        |            | Both      | No      |
| audit_log_flush                     |          |             | Yes        |            | Global    | Yes     |
| audit_log_format                    | Yes      | Yes         | Yes        |            | Global    | No      |
| audit_log_format_unix_timestamp     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_include_accounts          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_max_size                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_password_history_max_days | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_policy                    | Yes      | Yes         | Yes        |            | Global    | No      |
| audit_log_prune_seconds             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_read_buffer_size          | Yes      | Yes         | Yes        |            | Varies    | Varies  |
| audit_log_rotate_max_size           | Yes      | Yes         | Yes        |            | Global    | Yes     |

| Name                                           | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|------------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| audit_log_statement_policy                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| audit_log_strategy                             | Yes      | Yes         | Yes        |            | Global    | No      |
| Audit_log_total_size                           |          |             |            | Yes        | Global    | No      |
| Audit_log_write_waits                          |          |             |            | Yes        | Global    | No      |
| authentication_ldap_rp_id                      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_kerberos_service_key_tab        | Yes      | Yes         | Yes        |            | Global    | No      |
| authentication_kerberos_service_principal      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_auth_method_name      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_bind_base_dn          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_bind_sasl_dn          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_bind_sasl_pwd         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_ca_cert               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_group_search_attr     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_group_search_filter   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_init_pool_size        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_log_status            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_max_pool_size         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_referrals             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_server_host           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_server_port           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Authentication_ldap_sasl_supported_methods     |          |             | Yes        |            | Global    | No      |
| authentication_ldap_sasl_tls                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_sasl_user_search_attr      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_auth_method_name    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_bind_base_dn        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_bind_root_dn        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_bind_root_pwd       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_cleartext           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_group_search_attr   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_group_search_filter | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_init_pool_size      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_log_status          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_max_pool_size       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_referrals           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_server_host         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_server_port         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_tls                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_ldap_simple_user_search_attr    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_policy                          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| authentication_windows_logon_principal         | Yes      | Yes         | Yes        |            | Global    | No      |
| authentication_windows_use_principal_name      | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                                       | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| auto_generate_defaults                     | Yes      | Yes         | Yes        |            | Global    | No      |
| auto_increment_offset                      | Yes      | Yes         | Yes        |            | Both      | Yes     |
| auto_increment_offset_set                  | Yes      | Yes         | Yes        |            | Both      | Yes     |
| autocommit                                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| automatic_sp_privileges                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| avoid_temporal_upgrade                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| back_log                                   | Yes      | Yes         | Yes        |            | Global    | No      |
| basedir                                    | Yes      | Yes         | Yes        |            | Global    | No      |
| big_tables                                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| bind_address                               | Yes      | Yes         | Yes        |            | Global    | No      |
| Binlog_cache_disk_use                      |          |             |            | Yes        | Global    | No      |
| binlog_cache_size                          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Binlog_cache_use                           |          |             |            | Yes        | Global    | No      |
| binlog_checksum                            | Yes      | Yes         |            |            |           |         |
| binlog_checksums                           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_direct_non_transactional_updates    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| binlog-do-db                               | Yes      | Yes         |            |            |           |         |
| binlog_encrypt                             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_error_action                        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_expire_logs_auto_purge              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_expire_logs_seconds                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_format                              | Yes      | Yes         | Yes        |            | Both      | Yes     |
| binlog_group_commit_sync_delay             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_group_commit_sync_no_delay_count    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_gtid_slave_recovery                 | Yes      | Yes         | Yes        |            | Global    | No      |
| binlog-ignore-db                           | Yes      | Yes         |            |            |           |         |
| binlog_max_flush_queue_time                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_order_c Mits                        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_rotate_erption_masters              | Yes      | Yes         | Yes        |            | Global    | No      |
| binlog_row_events_max_size                 | Yes      | Yes         | Yes        |            | Global    | No      |
| binlog_row_image                           | Yes      | Yes         | Yes        |            | Both      | Yes     |
| binlog_row_metadata                        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| binlog_row_options                         | Yes      | Yes         | Yes        |            | Both      | Yes     |
| binlog_rows_query_log_events               | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Binlog_stmt_cache_disk_use                 |          |             |            | Yes        | Global    | No      |
| binlog_stmt_cache_size                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Binlog_stmt_cache_use                      |          |             |            | Yes        | Global    | No      |
| binlog_transactions_compression            | Yes      | Yes         | Yes        |            | Both      | Yes     |
| binlog_transactions_compression_level_zstd | Yes      | Yes         | Yes        |            | Both      | Yes     |

| Name                | Cmd-Line                        | Option File             | System Var | Status Var | Var Scope | Dynamic |
|---------------------|---------------------------------|-------------------------|------------|------------|-----------|---------|
| binlog_transactions | Yes (dependent)                 | Yes (history_size)      | Yes        |            | Global    | Yes     |
| binlog_transactions | Yes (dependent)                 | Yes (tracking)          | Yes        |            | Global    | Yes     |
| block_encryptio     | Yes (mode)                      | Yes                     | Yes        |            | Both      | Yes     |
| build_id            |                                 |                         | Yes        |            | Global    | No      |
| bulk_insert_bu      | Yes (size)                      | Yes                     | Yes        |            | Both      | Yes     |
| Bytes_received      |                                 |                         |            | Yes        | Both      | No      |
| Bytes_sent          |                                 |                         |            | Yes        | Both      | No      |
| caching_sha2_       | Yes (password_auto)             | Yes (generate_rsa_keys) | Yes        |            | Global    | No      |
| caching_sha2_       | Yes (password_digi              | Yes (rounds)            | Yes        |            | Global    | No      |
| caching_sha2_       | Yes (password_priv              | Yes (key_path)          | Yes        |            | Global    | No      |
| caching_sha2_       | Yes (password_pub               | Yes (key_path)          | Yes        |            | Global    | No      |
| Caching_sha2_       | password_rsa_public_key         |                         |            | Yes        | Global    | No      |
| character_set_      | client                          |                         | Yes        |            | Both      | Yes     |
| character-set-clien | Yes                             | Yes                     |            |            |           |         |
| character_set_      | connection                      |                         | Yes        |            | Both      | Yes     |
| character_set_      | database                        |                         | Yes        |            | Both      | Yes     |
| (note 1)            |                                 |                         |            |            |           |         |
| character_set_      | system                          | Yes                     | Yes        |            | Both      | Yes     |
| character_set_      | results                         |                         | Yes        |            | Both      | Yes     |
| character_set_      | server                          | Yes                     | Yes        |            | Both      | Yes     |
| character_set_      | system                          |                         | Yes        |            | Global    | No      |
| character_sets      | Yes                             | Yes                     | Yes        |            | Global    | No      |
| check_proxy_        | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| chroot              | Yes                             | Yes                     |            |            |           |         |
| clone_autotune      | Yes (concurrency)               | Yes                     | Yes        |            | Global    | Yes     |
| clone_block_d       | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| clone_buffer_s      | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| clone_ddl_time      | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| clone_delay_at      | Yes (data_drop)                 | Yes                     | Yes        |            | Global    | Yes     |
| clone_donor_t       | Yes (out_after_network_failure) | Yes                     |            |            | Global    | Yes     |
| clone_enable_       | Yes (compression)               | Yes                     | Yes        |            | Global    | Yes     |
| clone_max_co        | Yes (currency)                  | Yes                     | Yes        |            | Global    | Yes     |
| clone_max_dat       | Yes (bandwidth)                 | Yes                     | Yes        |            | Global    | Yes     |
| clone_max_netc      | Yes (link_bandwidth)            | Yes                     | Yes        |            | Global    | Yes     |
| clone_ssl_ca        | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| clone_ssl_cert      | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| clone_ssl_key       | Yes                             | Yes                     | Yes        |            | Global    | Yes     |
| clone_valid_d       | Yes (list)                      | Yes                     | Yes        |            | Global    | Yes     |
| collation_connec    |                                 |                         | Yes        |            | Both      | Yes     |

| Name                           | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------|----------|-------------|------------|------------|-----------|---------|
| collation_database<br>(note 1) |          |             | Yes        |            | Both      | Yes     |
| collation_server               | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Com_admin_commands             |          |             |            | Yes        | Both      | No      |
| Com.Alter_db                   |          |             |            | Yes        | Both      | No      |
| Com.Alter_event                |          |             |            | Yes        | Both      | No      |
| Com.Alter_function             |          |             |            | Yes        | Both      | No      |
| Com.Alter_procedure            |          |             |            | Yes        | Both      | No      |
| Com.Alter_resource_group       |          |             |            | Yes        | Global    | No      |
| Com.Alter_server               |          |             |            | Yes        | Both      | No      |
| Com.Alter_table                |          |             |            | Yes        | Both      | No      |
| Com.Alter_tablespace           |          |             |            | Yes        | Both      | No      |
| Com.Alter_user                 |          |             |            | Yes        | Both      | No      |
| Com.Alter_user_default_role    |          |             |            | Yes        | Global    | No      |
| Com.Analyze                    |          |             |            | Yes        | Both      | No      |
| Com.Assign_to_keycache         |          |             |            | Yes        | Both      | No      |
| Com.Begin                      |          |             |            | Yes        | Both      | No      |
| Com.Binlog                     |          |             |            | Yes        | Both      | No      |
| Com.Call_procedure             |          |             |            | Yes        | Both      | No      |
| Com.Change_db                  |          |             |            | Yes        | Both      | No      |
| Com.Change_master              |          |             |            | Yes        | Both      | No      |
| Com.Change_repl_filter         |          |             |            | Yes        | Both      | No      |
| Com.Change_replication_source  |          |             |            | Yes        | Both      | No      |
| Com.Check                      |          |             |            | Yes        | Both      | No      |
| Com.Checksum                   |          |             |            | Yes        | Both      | No      |
| Com.Clone                      |          |             |            | Yes        | Global    | No      |
| Com.Commit                     |          |             |            | Yes        | Both      | No      |
| Com.Create_db                  |          |             |            | Yes        | Both      | No      |
| Com.Create_event               |          |             |            | Yes        | Both      | No      |
| Com.Create_function            |          |             |            | Yes        | Both      | No      |
| Com.Create_index               |          |             |            | Yes        | Both      | No      |
| Com.Create_procedure           |          |             |            | Yes        | Both      | No      |
| Com.Create_resource_group      |          |             |            | Yes        | Global    | No      |
| Com.Create_role                |          |             |            | Yes        | Global    | No      |
| Com.Create_server              |          |             |            | Yes        | Both      | No      |
| Com.Create_table               |          |             |            | Yes        | Both      | No      |
| Com.Create_trigger             |          |             |            | Yes        | Both      | No      |
| Com.Create_udf                 |          |             |            | Yes        | Both      | No      |
| Com.Create_user                |          |             |            | Yes        | Both      | No      |
| Com.Create_view                |          |             |            | Yes        | Both      | No      |
| Com.Dealloc_sql                |          |             |            | Yes        | Both      | No      |

| Name                        | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-----------------------------|----------|-------------|------------|------------|-----------|---------|
| Com_delete                  |          |             |            | Yes        | Both      | No      |
| Com_delete_multi            |          |             |            | Yes        | Both      | No      |
| Com_do                      |          |             |            | Yes        | Both      | No      |
| Com_drop_db                 |          |             |            | Yes        | Both      | No      |
| Com_drop_event              |          |             |            | Yes        | Both      | No      |
| Com_drop_function           |          |             |            | Yes        | Both      | No      |
| Com_drop_index              |          |             |            | Yes        | Both      | No      |
| Com_drop_procedure          |          |             |            | Yes        | Both      | No      |
| Com_drop_resource_group     |          |             |            | Yes        | Global    | No      |
| Com_drop_role               |          |             |            | Yes        | Global    | No      |
| Com_drop_server             |          |             |            | Yes        | Both      | No      |
| Com_drop_table              |          |             |            | Yes        | Both      | No      |
| Com_drop_trigger            |          |             |            | Yes        | Both      | No      |
| Com_drop_user               |          |             |            | Yes        | Both      | No      |
| Com_drop_view               |          |             |            | Yes        | Both      | No      |
| Com_empty_query             |          |             |            | Yes        | Both      | No      |
| Com_execute_sql             |          |             |            | Yes        | Both      | No      |
| Com_explain_other           |          |             |            | Yes        | Both      | No      |
| Com_flush                   |          |             |            | Yes        | Both      | No      |
| Com_get_diagnostics         |          |             |            | Yes        | Both      | No      |
| Com_grant                   |          |             |            | Yes        | Both      | No      |
| Com_grant_roles             |          |             |            | Yes        | Global    | No      |
| Com_group_replication_start |          |             |            | Yes        | Global    | No      |
| Com_group_replication_stop  |          |             |            | Yes        | Global    | No      |
| Com_ha_close                |          |             |            | Yes        | Both      | No      |
| Com_ha_open                 |          |             |            | Yes        | Both      | No      |
| Com_ha_read                 |          |             |            | Yes        | Both      | No      |
| Com_help                    |          |             |            | Yes        | Both      | No      |
| Com_insert                  |          |             |            | Yes        | Both      | No      |
| Com_insert_select           |          |             |            | Yes        | Both      | No      |
| Com_install_component       |          |             |            | Yes        | Global    | No      |
| Com_install_plugin          |          |             |            | Yes        | Both      | No      |
| Com_kill                    |          |             |            | Yes        | Both      | No      |
| Com_load                    |          |             |            | Yes        | Both      | No      |
| Com_lock_tables             |          |             |            | Yes        | Both      | No      |
| Com_optimize                |          |             |            | Yes        | Both      | No      |
| Com_preload_keys            |          |             |            | Yes        | Both      | No      |
| Com_prepare_sql             |          |             |            | Yes        | Both      | No      |
| Com_purge                   |          |             |            | Yes        | Both      | No      |
| Com_purge_before_date       |          |             |            | Yes        | Both      | No      |
| Com_release_savepoint       |          |             |            | Yes        | Both      | No      |

| Name                      | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------|----------|-------------|------------|------------|-----------|---------|
| Com_rename_table          |          |             |            | Yes        | Both      | No      |
| Com_rename_user           |          |             |            | Yes        | Both      | No      |
| Com_repair                |          |             |            | Yes        | Both      | No      |
| Com_replace               |          |             |            | Yes        | Both      | No      |
| Com_replace_select        |          |             |            | Yes        | Both      | No      |
| Com_replica_start         |          |             |            | Yes        | Both      | No      |
| Com_replica_stop          |          |             |            | Yes        | Both      | No      |
| Com_reset                 |          |             |            | Yes        | Both      | No      |
| Com_resignal              |          |             |            | Yes        | Both      | No      |
| Com_restart               |          |             |            | Yes        | Both      | No      |
| Com_revoke                |          |             |            | Yes        | Both      | No      |
| Com_revoke_all            |          |             |            | Yes        | Both      | No      |
| Com_revoke_roles          |          |             |            | Yes        | Global    | No      |
| Com_rollback              |          |             |            | Yes        | Both      | No      |
| Com_rollback_to_savepoint |          |             |            | Yes        | Both      | No      |
| Com_savepoint             |          |             |            | Yes        | Both      | No      |
| Com_select                |          |             |            | Yes        | Both      | No      |
| Com_set_option            |          |             |            | Yes        | Both      | No      |
| Com_set_resource_group    |          |             |            | Yes        | Global    | No      |
| Com_set_role              |          |             |            | Yes        | Global    | No      |
| Com_show_authors          |          |             |            | Yes        | Both      | No      |
| Com_show_binlog_events    |          |             |            | Yes        | Both      | No      |
| Com_show_binlogs          |          |             |            | Yes        | Both      | No      |
| Com_showCharsets          |          |             |            | Yes        | Both      | No      |
| Com_show_collations       |          |             |            | Yes        | Both      | No      |
| Com_show_contributors     |          |             |            | Yes        | Both      | No      |
| Com_show_create_db        |          |             |            | Yes        | Both      | No      |
| Com_show_create_event     |          |             |            | Yes        | Both      | No      |
| Com_show_create_func      |          |             |            | Yes        | Both      | No      |
| Com_show_create_proc      |          |             |            | Yes        | Both      | No      |
| Com_show_create_table     |          |             |            | Yes        | Both      | No      |
| Com_show_create_trigger   |          |             |            | Yes        | Both      | No      |
| Com_show_create_user      |          |             |            | Yes        | Both      | No      |
| Com_show_databases        |          |             |            | Yes        | Both      | No      |
| Com_show_engine_logs      |          |             |            | Yes        | Both      | No      |
| Com_show_engine_mutex     |          |             |            | Yes        | Both      | No      |
| Com_show_engine_status    |          |             |            | Yes        | Both      | No      |
| Com_show_errors           |          |             |            | Yes        | Both      | No      |
| Com_show_events           |          |             |            | Yes        | Both      | No      |
| Com_show_fields           |          |             |            | Yes        | Both      | No      |
| Com_show_function_code    |          |             |            | Yes        | Both      | No      |

| Name                      | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------|----------|-------------|------------|------------|-----------|---------|
| Com_show_function_status  |          |             |            | Yes        | Both      | No      |
| Com_show_grants           |          |             |            | Yes        | Both      | No      |
| Com_show_keys             |          |             |            | Yes        | Both      | No      |
| Com_show_master_status    |          |             |            | Yes        | Both      | No      |
| Com_show_ndb_status       |          |             |            | Yes        | Both      | No      |
| Com_show_open_tables      |          |             |            | Yes        | Both      | No      |
| Com_show_plugins          |          |             |            | Yes        | Both      | No      |
| Com_show_privileges       |          |             |            | Yes        | Both      | No      |
| Com_show_procedure_code   |          |             |            | Yes        | Both      | No      |
| Com_show_procedure_status |          |             |            | Yes        | Both      | No      |
| Com_show_processlist      |          |             |            | Yes        | Both      | No      |
| Com_show_profile          |          |             |            | Yes        | Both      | No      |
| Com_show_profiles         |          |             |            | Yes        | Both      | No      |
| Com_show_relaylog_events  |          |             |            | Yes        | Both      | No      |
| Com_show_replica_status   |          |             |            | Yes        | Both      | No      |
| Com_show_replicas         |          |             |            | Yes        | Both      | No      |
| Com_show_slave_hosts      |          |             |            | Yes        | Both      | No      |
| Com_show_slave_status     |          |             |            | Yes        | Both      | No      |
| Com_show_status           |          |             |            | Yes        | Both      | No      |
| Com_show_storage_engines  |          |             |            | Yes        | Both      | No      |
| Com_show_table_status     |          |             |            | Yes        | Both      | No      |
| Com_show_tables           |          |             |            | Yes        | Both      | No      |
| Com_show_triggers         |          |             |            | Yes        | Both      | No      |
| Com_show_variables        |          |             |            | Yes        | Both      | No      |
| Com_show_warnings         |          |             |            | Yes        | Both      | No      |
| Com_shutdown              |          |             |            | Yes        | Both      | No      |
| Com_signal                |          |             |            | Yes        | Both      | No      |
| Com_slave_start           |          |             |            | Yes        | Both      | No      |
| Com_slave_stop            |          |             |            | Yes        | Both      | No      |
| Com_stmt_close            |          |             |            | Yes        | Both      | No      |
| Com_stmt_execute          |          |             |            | Yes        | Both      | No      |
| Com_stmt_fetch            |          |             |            | Yes        | Both      | No      |
| Com_stmt_prepare          |          |             |            | Yes        | Both      | No      |
| Com_stmt_reprepare        |          |             |            | Yes        | Both      | No      |
| Com_stmt_reset            |          |             |            | Yes        | Both      | No      |
| Com_stmt_send_long_data   |          |             |            | Yes        | Both      | No      |
| Com_truncate              |          |             |            | Yes        | Both      | No      |
| Com_uninstall_component   |          |             |            | Yes        | Global    | No      |
| Com_uninstall_plugin      |          |             |            | Yes        | Both      | No      |
| Com_unlock_tables         |          |             |            | Yes        | Both      | No      |
| Com_update                |          |             |            | Yes        | Both      | No      |

| Name                               | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Com_update_multi                   |          |             |            | Yes        | Both      | No      |
| Com_xa_commit                      |          |             |            | Yes        | Both      | No      |
| Com_xa_end                         |          |             |            | Yes        | Both      | No      |
| Com_xa_prepare                     |          |             |            | Yes        | Both      | No      |
| Com_xa_recover                     |          |             |            | Yes        | Both      | No      |
| Com_xa_rollback                    |          |             |            | Yes        | Both      | No      |
| Com_xa_start                       |          |             |            | Yes        | Both      | No      |
| completion_type                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Compression                        |          |             |            | Yes        | Session   | No      |
| Compression_algorithm              |          |             |            | Yes        | Global    | No      |
| Compression_level                  |          |             |            | Yes        | Global    | No      |
| concurrent_insets                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| connect_timeout                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Connection_control_delay_generated |          |             |            | Yes        | Global    | No      |
| connection_count                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| connection_count_max               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| connection_count_min               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Connection_errors_accept           |          |             |            | Yes        | Global    | No      |
| Connection_errors_internal         |          |             |            | Yes        | Global    | No      |
| Connection_errors_max_connections  |          |             |            | Yes        | Global    | No      |
| Connection_errors_peer_address     |          |             |            | Yes        | Global    | No      |
| Connection_errors_select           |          |             |            | Yes        | Global    | No      |
| Connection_errors_tcpwrap          |          |             |            | Yes        | Global    | No      |
| connection_max_error_chunk_size    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| connection_max_error_limit         | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Connections                        |          |             |            | Yes        | Global    | No      |
| console                            | Yes      | Yes         |            |            |           |         |
| core-file                          | Yes      | Yes         |            |            |           |         |
| core_file                          |          |             | Yes        |            | Global    | No      |
| create_admin_users                 | Yes      | Yes         | Yes        |            | Global    | No      |
| Created_tmp_disk_tables            |          |             |            | Yes        | Both      | No      |
| Created_tmp_files                  |          |             |            | Yes        | Global    | No      |
| Created_tmp_tables                 |          |             |            | Yes        | Both      | No      |
| cte_max_recursion_depth            | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Current_tls_ca                     |          |             |            | Yes        | Global    | No      |
| Current_tls_capath                 |          |             |            | Yes        | Global    | No      |
| Current_tls_cert                   |          |             |            | Yes        | Global    | No      |
| Current_tls_cipher                 |          |             |            | Yes        | Global    | No      |
| Current_tls_ciphersuites           |          |             |            | Yes        | Global    | No      |
| Current_tls_crl                    |          |             |            | Yes        | Global    | No      |
| Current_tls_crlpath                |          |             |            | Yes        | Global    | No      |

| Name                           | Cmd-Line | Option File | System Var                     | Status Var | Var Scope | Dynamic |
|--------------------------------|----------|-------------|--------------------------------|------------|-----------|---------|
| Current_tls_key                |          |             |                                | Yes        | Global    | No      |
| Current_tls_version            |          |             |                                | Yes        | Global    | No      |
| daemon_memcached_enable        | Yes      | Yes         | log                            | Yes        | Global    | No      |
| daemon_memcached_engine        | Yes      | Yes         | name                           | Yes        | Global    | No      |
| daemon_memcached_engine        | Yes      | Yes         | path                           | Yes        | Global    | No      |
| daemon_memcached_option        | Yes      | Yes         | option                         | Yes        | Global    | No      |
| daemon_memcached_r_batch_size  | Yes      | Yes         | r_batch_size                   | Yes        | Global    | No      |
| daemon_memcached_w_batch_size  | Yes      | Yes         | w_batch_size                   | Yes        | Global    | No      |
| daemonize                      | Yes      | Yes         |                                |            |           |         |
| datadir                        | Yes      | Yes         | Yes                            |            | Global    | No      |
| ddl-rewriter                   | Yes      | Yes         |                                |            |           |         |
| debug                          | Yes      | Yes         | Yes                            |            | Both      | Yes     |
| debug_sync                     |          |             | Yes                            |            | Session   | Yes     |
| debug-sync-timeout             | Yes      | Yes         |                                |            |           |         |
| default_authentication_plugin  | Yes      | Yes         | authentication_plugin          | Yes        | Global    | No      |
| default_collation_for_utf8mb4  |          |             | collation_for_utf8mb4          | Yes        | Both      | Yes     |
| default_password_lifetime      | Yes      | Yes         | password_lifetime              | Yes        | Global    | Yes     |
| default_storage_engine         | Yes      | Yes         | storage_engine                 | Yes        | Both      | Yes     |
| default_table_option           | Yes      | Yes         | table_option                   | Yes        | Both      | Yes     |
| default-time-zone              | Yes      | Yes         |                                |            |           |         |
| default_tmp_storage_engine     | Yes      | Yes         | tmp_storage_engine             | Yes        | Both      | Yes     |
| default_week_format            | Yes      | Yes         | week_format                    | Yes        | Both      | Yes     |
| defaults-extra-file            | Yes      |             |                                |            |           |         |
| defaults-file                  | Yes      |             |                                |            |           |         |
| defaults-group-suffix          | Yes      |             |                                |            |           |         |
| delay_key_write                | Yes      | Yes         | delay_key_write                | Yes        | Global    | Yes     |
| Delayed_errors                 |          |             |                                | Yes        | Global    | No      |
| delayed_insert                 | Yes      | Yes         | delayed_insert                 | Yes        | Global    | Yes     |
| Delayed_insert_threads         |          |             |                                | Yes        | Global    | No      |
| delayed_insert_timeout         | Yes      | Yes         | delayed_insert_timeout         | Yes        | Global    | Yes     |
| delayed_queue_size             | Yes      | Yes         | delayed_queue_size             | Yes        | Global    | Yes     |
| Delayed_writes                 |          |             |                                | Yes        | Global    | No      |
| disabled_storage_engines       | Yes      | Yes         | disabled_storage_engines       | Yes        | Global    | No      |
| disconnect_on_expired_password | Yes      | Yes         | disconnect_on_expired_password | Yes        | Global    | No      |
| disconnect-slave-event-count   | Yes      | Yes         |                                |            |           |         |
| div_precision_increment        | Yes      | Yes         | div_precision_increment        | Yes        | Both      | Yes     |

| Name                                           | Cmd-Line | Option File             | System Var | Status Var | Var Scope | Dynamic |
|------------------------------------------------|----------|-------------------------|------------|------------|-----------|---------|
| dragnet.log_error                              | Yes      | filter_rules            | Yes        |            | Global    | Yes     |
| dragnet.Status                                 |          |                         |            | Yes        | Global    | No      |
| early-plugin-load                              | Yes      | Yes                     |            |            |           |         |
| end_markers_in_json                            | Yes      | Yes                     | Yes        |            | Both      | Yes     |
| enforce_gtid_consistency                       | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| enterprise_encrypt_max_size                    | Yes      | maximum_rsa_key_sizes   | Yes        |            | Global    | Yes     |
| enterprise_encrypt_rsa_suppress_legacy_padding | Yes      | suppress_legacy_padding | Yes        |            | Global    | Yes     |
| eq_range_index_depth                           | Yes      | index_depth             | Yes        |            | Both      | Yes     |
| error_count                                    |          |                         | Yes        |            | Session   | No      |
| Error_log_buffered_bytes                       |          |                         |            | Yes        | Global    | No      |
| Error_log_buffered_events                      |          |                         |            | Yes        | Global    | No      |
| Error_log_expired_events                       |          |                         |            | Yes        | Global    | No      |
| Error_log_latest_write                         |          |                         |            | Yes        | Global    | No      |
| event_scheduler                                | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| exit-info                                      | Yes      | Yes                     |            |            |           |         |
| expire_logs_days                               | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| explain_format                                 | Yes      | Yes                     | Yes        |            | Both      | Yes     |
| explicit_defaults_for_timestamp                | Yes      | for_timestamp           | Yes        |            | Both      | Yes     |
| external-locking                               | Yes      | Yes                     |            |            |           |         |
| - Variable:<br>skip_external_locking           |          |                         |            |            |           |         |
| external_user                                  |          |                         | Yes        |            | Session   | No      |
| federated                                      | Yes      | Yes                     |            |            |           |         |
| Firewall_access_denied                         |          |                         |            | Yes        | Global    | No      |
| Firewall_access_granted                        |          |                         |            | Yes        | Global    | No      |
| Firewall_cached_entries                        |          |                         |            | Yes        | Global    | No      |
| flush                                          | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| Flush_commands                                 |          |                         |            | Yes        | Global    | No      |
| flush_time                                     | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| foreign_key_checks                             |          |                         | Yes        |            | Both      | Yes     |
| ft_boolean_syntax                              | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| ft_max_word_length                             | Yes      | Yes                     | Yes        |            | Global    | No      |
| ft_min_word_length                             | Yes      | Yes                     | Yes        |            | Global    | No      |
| ft_query_expansion_limit                       | Yes      | Yes                     | Yes        |            | Global    | No      |
| ft_stopword_file                               | Yes      | Yes                     | Yes        |            | Global    | No      |
| gdb                                            | Yes      | Yes                     |            |            |           |         |
| general_log                                    | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| general_log_file                               | Yes      | Yes                     | Yes        |            | Global    | Yes     |
| generated_random_password_length               | Yes      | password_length         | Yes        |            | Both      | Yes     |
| Global_connection_memory                       |          |                         |            | Yes        | Global    | No      |

| Name                                                | Cmd-Line | Option File  | System Var | Status Var           | Var Scope | Dynamic |
|-----------------------------------------------------|----------|--------------|------------|----------------------|-----------|---------|
| global_connect_timeout                              | Yes      | memory_limit | Yes        |                      | Global    | Yes     |
| global_connect_timeout                              | Yes      | memory_limit | Yes        |                      | Both      | Yes     |
| group_concat_max_len                                | Yes      | Yes          | Yes        |                      | Both      | Yes     |
| group_replication_advertise_member_endpoints        | Yes      | Yes          | Yes        | very_endpoints       | Global    | Yes     |
| group_replication_allow_local_updates               | Yes      | Yes          | Yes        | version              | Global    | Yes     |
| group_replication_auto_increment_offset             | Yes      | Yes          | Yes        | increment            | Global    | Yes     |
| group_replication_autorejoin_tries                  | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_bootstrap_selector                | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_clone_threshold                   | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_comunicate_debug_options          | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_comunicate_max_message_size       | Yes      | Yes          | Yes        | message_size         | Global    | Yes     |
| group_replication_communication_stack               |          | Yes          |            |                      | Global    | No      |
| group_replication_component_stop_timeout            | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_compression_threshold             | Yes      | Yes          | Yes        | threshold            | Global    | Yes     |
| group_replication_consistency                       | Yes      | Yes          | Yes        |                      | Both      | Yes     |
| group_replication_enforce_update_everywhere_checks  | Yes      | Yes          | Yes        | everywhere_checks    | Global    | Yes     |
| group_replication_exit_state_action                 | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_flow_control_supplier_threshold   | Yes      | Yes          | Yes        | supplier_threshold   | Global    | Yes     |
| group_replication_flow_control_certifier_threshold  | Yes      | Yes          | Yes        | certifier_threshold  | Global    | Yes     |
| group_replication_flow_control_told_percent         | Yes      | Yes          | Yes        | told_percent         | Global    | Yes     |
| group_replication_flow_control_max_quota            | Yes      | Yes          | Yes        | max_quota            | Global    | Yes     |
| group_replication_flow_control_member_quota_percent | Yes      | Yes          | Yes        | member_quota_percent | Global    | Yes     |
| group_replication_flow_control_min_quota            | Yes      | Yes          | Yes        | min_quota            | Global    | Yes     |
| group_replication_flow_control_min_recovery_uptime  | Yes      | Yes          | Yes        | min_recovery_uptime  | Global    | Yes     |
| group_replication_flow_control_mode                 | Yes      | Yes          | Yes        | mode                 | Global    | Yes     |
| group_replication_flow_control_period               | Yes      | Yes          | Yes        | period               | Global    | Yes     |
| group_replication_flow_control_release_percent      | Yes      | Yes          | Yes        | release_percent      | Global    | Yes     |
| group_replication_force_members                     | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_group_name                        | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_group_seeds                       | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_gtid_assignment_block_size        | Yes      | Yes          | Yes        | block_size           | Global    | Yes     |
| group_replication_ip_allowlist                      | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_ip_whitelist                      | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_local_address                     | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_member_expire_timeout             | Yes      | Yes          | Yes        | timeout              | Global    | Yes     |
| group_replication_member_weight                     | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_message_size                      | Yes      | Yes          | Yes        | message_size         | Global    | Yes     |
| group_replication_paxos_single_leader               | Yes      | Yes          | Yes        | leader               | Global    | Yes     |
| group_replication_poll_spin_loops                   | Yes      | Yes          | Yes        |                      | Global    | Yes     |
| group_replication_primary_member                    |          |              | Yes        |                      | Global    | No      |
| group_replication_recovery_complete_at              | Yes      | Yes          | Yes        | complete_at          | Global    | Yes     |

| Name                                              | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| group_replication_recovery_compression_algorithms | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_public_key             | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_pkc_key_path           | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_reconnect_interv       | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_retries_count          | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_ca                 | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_ca_path            | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_cert               | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_cipher             | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_crl                | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_crlpath            | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_key                | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_ssl_verify_servercert  | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_tlsiphersuites         | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_tls_version            | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_recovery_use_ssl                | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_zst_compression_level           | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_single_prime_mode               | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_ssl_mode                        | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_start_on_boot                   | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_ts_source                       | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_transaction_size_limit          | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_unreachable_majority_time       | Yes      | Yes         |            |            | Global    | Yes     |
| group_replication_view_change_uuid                | Yes      | Yes         |            |            | Global    | Yes     |
| gtid_executed                                     |          |             | Yes        |            | Global    | No      |
| gtid_executed_compression_trail                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| gtid_mode                                         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| gtid_next                                         |          |             | Yes        |            | Session   | Yes     |
| gtid_owned                                        |          |             | Yes        |            | Both      | No      |
| gtid_purged                                       |          |             | Yes        |            | Global    | Yes     |
| Handler_commit                                    |          |             |            | Yes        | Both      | No      |
| Handler_delete                                    |          |             |            | Yes        | Both      | No      |
| Handler_discover                                  |          |             |            | Yes        | Both      | No      |
| Handler_external_lock                             |          |             |            | Yes        | Both      | No      |
| Handler_mrr_init                                  |          |             |            | Yes        | Both      | No      |
| Handler_prepare                                   |          |             |            | Yes        | Both      | No      |
| Handler_read_first                                |          |             |            | Yes        | Both      | No      |
| Handler_read_key                                  |          |             |            | Yes        | Both      | No      |
| Handler_read_last                                 |          |             |            | Yes        | Both      | No      |
| Handler_read_next                                 |          |             |            | Yes        | Both      | No      |
| Handler_read_prev                                 |          |             |            | Yes        | Both      | No      |

| Name                                 | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Handler_read_rnd                     |          |             |            | Yes        | Both      | No      |
| Handler_read_rnd_next                |          |             |            | Yes        | Both      | No      |
| Handler_rollback                     |          |             |            | Yes        | Both      | No      |
| Handler_savepoint                    |          |             |            | Yes        | Both      | No      |
| Handler_savepoint_rollback           |          |             |            | Yes        | Both      | No      |
| Handler_update                       |          |             |            | Yes        | Both      | No      |
| Handler_write                        |          |             |            | Yes        | Both      | No      |
| have_compress                        |          |             | Yes        |            | Global    | No      |
| have_dynamic_loading                 |          |             | Yes        |            | Global    | No      |
| have_geometry                        |          |             | Yes        |            | Global    | No      |
| have_openssl                         |          |             | Yes        |            | Global    | No      |
| have_profiling                       |          |             | Yes        |            | Global    | No      |
| have_query_cache                     |          |             | Yes        |            | Global    | No      |
| have_rtree_keys                      |          |             | Yes        |            | Global    | No      |
| have_ssl                             |          |             | Yes        |            | Global    | No      |
| have_statement_timeout               |          |             | Yes        |            | Global    | No      |
| have_symlink                         |          |             | Yes        |            | Global    | No      |
| help                                 | Yes      | Yes         |            |            |           |         |
| histogram_generation_max_size        | Yes      | Yes         | Yes        |            | Both      | Yes     |
| host_cache_size                      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| hostname                             |          |             | Yes        |            | Global    | No      |
| identity                             |          |             | Yes        |            | Session   | Yes     |
| immediate_server_version             |          |             | Yes        |            | Session   | Yes     |
| information_schema_stats_expiry      | Yes      | Yes         | Yes        |            | Both      | Yes     |
| init_connect                         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| init_file                            | Yes      | Yes         | Yes        |            | Global    | No      |
| init_replica                         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| init_slave                           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| initialize                           | Yes      | Yes         |            |            |           |         |
| initialize-insecure                  | Yes      | Yes         |            |            |           |         |
| innodb                               | Yes      | Yes         |            |            |           |         |
| innodb_adaptive_flushing             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_adaptive_flushing_lwm         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_adaptive_hash_index           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_adaptive_hash_index_threshold | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_adaptive_max_sleep_delay      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_api_bk_commit_interval        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_api_disable_rowlock           | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_api_enable_binlog             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_api_enable_mdl                | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                                      | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| innodb_api_trx                            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_autoextend_increment               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_autoinc_lock_mode                  | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_background_log_dump_list           | Yes      | Yes         | empty      | Yes        | Global    | Yes     |
| Innodb_buffer_pool_bytes_data             |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_bytes_dirty            |          |             |            | Yes        | Global    | No      |
| innodb_buffer_pool_chunk_size             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_buffer_pool_debug                  | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_buffer_pool_dump_at_shutdown       | Yes      | Yes         | down       | Yes        | Global    | Yes     |
| innodb_buffer_pool_dump_now               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_buffer_pool_dump_pc                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_buffer_pool_dump_status            |          |             |            | Yes        | Global    | No      |
| innodb_buffer_pool_filename               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_buffer_pool_in_core                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_buffer_pool_instances              | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_buffer_pool_load_abort             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_buffer_pool_load_at_startup        | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_buffer_pool_load_now               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_buffer_pool_load_status            |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_data             |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_dirty            |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_flushed          |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_free             |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_latched          |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_misc             |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_pages_total            |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_read_ahead             |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_read_ahead_evicted     |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_read_ahead_rnd         |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_read_requests          |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_reads                  |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_resize_status          |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_resize_status_code     |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_resize_status_progress |          |             |            | Yes        | Global    | No      |
| innodb_buffer_pool_size                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_buffer_pool_wait_free              |          |             |            | Yes        | Global    | No      |
| Innodb_buffer_pool_write_requests         |          |             |            | Yes        | Global    | No      |
| innodb_change-buffer_max_size             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_change-buffering                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_change-buffering_debug             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_checkpoint_disabled                | Yes      | Yes         | Yes        |            | Global    | Yes     |

| Name                       | Cmd-Line                        | Option File | System Var | Status Var | Var Scope | Dynamic |
|----------------------------|---------------------------------|-------------|------------|------------|-----------|---------|
| innodb_checks              | Yes_algorithm                   | Yes         | Yes        |            | Global    | Yes     |
| innodb_cmp_p               | Yes_index_enabled               | Yes         | Yes        |            | Global    | Yes     |
| innodb_commi               | Yes_ncurrency                   | Yes         | Yes        |            | Global    | Yes     |
| innodb_compre              | Yes_debug                       | Yes         | Yes        |            | Global    | Yes     |
| innodb_compre              | Yesession_failure_threshold_pct | Yes         |            |            | Global    | Yes     |
| innodb_compre              | Yesion_level                    | Yes         | Yes        |            | Global    | Yes     |
| innodb_compre              | Yesion_pad_pct                  | Yes         | Yes        |            | Global    | Yes     |
| innodb_concur              | Yesency_tickets                 | Yes         | Yes        |            | Global    | Yes     |
| innodb_data_f              | Yes_path                        | Yes         | Yes        |            | Global    | No      |
| Innodb_data_fsyncs         |                                 |             |            | Yes        | Global    | No      |
| innodb_data_h              | Yes_dir                         | Yes         | Yes        |            | Global    | No      |
| Innodb_data_pending_fsyncs |                                 |             |            | Yes        | Global    | No      |
| Innodb_data_pending_reads  |                                 |             |            | Yes        | Global    | No      |
| Innodb_data_pending_writes |                                 |             |            | Yes        | Global    | No      |
| Innodb_data_read           |                                 |             |            | Yes        | Global    | No      |
| Innodb_data_reads          |                                 |             |            | Yes        | Global    | No      |
| Innodb_data_writes         |                                 |             |            | Yes        | Global    | No      |
| Innodb_data_written        |                                 |             |            | Yes        | Global    | No      |
| Innodb dblwr_pages_written |                                 |             |            | Yes        | Global    | No      |
| Innodb dblwr_writes        |                                 |             |            | Yes        | Global    | No      |
| innodb_ddl_bu              | Yes_size                        | Yes         | Yes        |            | Both      | Yes     |
| innodb_ddl_log             | Yesash_reset                    | Yes         | Yes        |            | Global    | Yes     |
| innodb_ddl_thre            | Yes                             | Yes         | Yes        |            | Both      | Yes     |
| innodb_deadlock            | Yes_detect                      | Yes         | Yes        |            | Global    | Yes     |
| innodb_dedicat             | Yes_server                      | Yes         | Yes        |            | Global    | No      |
| innodb_defaul              | Yesv_format                     | Yes         | Yes        |            | Global    | Yes     |
| innodb_directo             | Yes                             | Yes         | Yes        |            | Global    | No      |
| innodb_disable             | Yesrt_file_cach                 | Yes         | Yes        |            | Global    | Yes     |
| innodb_double              | Yes                             | Yes         | Yes        |            | Global    | Varies  |
| innodb_double              | Yes_batch_size                  | Yes         | Yes        |            | Global    | No      |
| innodb_double              | Yes_dir                         | Yes         | Yes        |            | Global    | No      |
| innodb_double              | Yes_files                       | Yes         | Yes        |            | Global    | No      |
| innodb_double              | Yes_pages                       | Yes         | Yes        |            | Global    | No      |
| innodb_extend              | Yesd_initialize                 | Yes         | Yes        |            | Global    | Yes     |
| innodb_fast_sh             | Yesown                          | Yes         | Yes        |            | Global    | Yes     |
| innodb_fil_ma              | Yesage_dirty                    | Yes         | Yes        |            | Global    | Yes     |
| innodb_file_pe             | Yesble                          | Yes         | Yes        |            | Global    | Yes     |
| innodb_fill_fa             | Yes                             | Yes         | Yes        |            | Global    | Yes     |
| innodb_flush_              | Yesat_timeout                   | Yes         | Yes        |            | Global    | Yes     |
| innodb_flush_              | Yesat_trx_commi                 | Yes         | Yes        |            | Global    | Yes     |
| innodb_flush_m             | Yesod                           | Yes         | Yes        |            | Global    | No      |

| Name                              | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-----------------------------------|----------|-------------|------------|------------|-----------|---------|
| innodb_flush_neighbors            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_flush_synchronous_commit   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_flushing_avg_loops         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_force_recovery             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_force_recovery             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_fsync_threshold            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_ft_aux_table               |          |             | Yes        |            | Global    | Yes     |
| innodb_ft_cache_size              | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_ft_enable_diag_print       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_ft_enable_stopword         | Yes      | Yes         | Yes        |            | Both      | Yes     |
| innodb_ft_max_token_size          | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_ft_min_token_size          | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_ft_num_word_optimize       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_ft_result_cache_limit      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_ft_server_stopword_table   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_ft_sort_pll_degree         | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_ft_total_token_size        | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_ft_user_stopword_table     | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Innodb_have_atomic_builtins       |          |             |            | Yes        | Global    | No      |
| innodb_idle_flush_pct             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_io_capacity                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_io_capacity_max            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_limit_optimistic_inserts   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_lock_wait_timeout          | Yes      | Yes         | Yes        |            | Both      | Yes     |
| innodb_log_buffer_size            | Yes      | Yes         | Yes        |            | Global    | Varies  |
| innodb_log_checkpoint_fuzzy       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_log_checkpoint_now         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_log_checksums              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_log_compressed_pages       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_log_file_size              | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_log_file_name_group        | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_log_group_home_dir         | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_log_ipu_abs_low            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_log_ipu_pct_hw             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_log_waits_for_flush_spills | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_log_waits                  |          |             |            | Yes        | Global    | No      |
| innodb_log_writes_ahead_size      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_log_write_requests         |          |             |            | Yes        | Global    | No      |
| innodb_log_writes_threads         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_log_writes                 |          |             |            | Yes        | Global    | No      |
| innodb_lru_scan_depth             | Yes      | Yes         | Yes        |            | Global    | Yes     |

| Name                                 | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|------------|------------|-----------|---------|
| innodb_max_d<br>Yes_pages_pct        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_max_d<br>Yes_pages_pct        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_max_p<br>Yes_lag              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_max_p<br>Yes_lag_delay        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_max_u<br>Yes_log_size         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_merge_Yes<br>threshold_set    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_monito<br>Yesable             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_monito<br>Yesable             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_monito<br>Yesset              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_monito<br>Yesset_all          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_num_ope<br>n_files            |          |             | Yes        |            | Global    | No      |
| innodb numa_Yes<br>leave             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_old_blo<br>cks_pct            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_old_blo<br>cks_time           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_online_Yes<br>per_log_max     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_open_f<br>iles                | Yes      | Yes         | Yes        |            | Global    | Varies  |
| innodb_optimize<br>fulltext_only     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_os_log_f<br>syncs             |          |             | Yes        |            | Global    | No      |
| Innodb_os_log_p<br>ending_fsyncs     |          |             | Yes        |            | Global    | No      |
| Innodb_os_log_p<br>ending_writes     |          |             | Yes        |            | Global    | No      |
| Innodb_os_log_w<br>ritten            |          |             | Yes        |            | Global    | No      |
| innodb_page_Yes<br>ers               | Yes      | Yes         | Yes        |            | Global    | No      |
| Innodb_page_s<br>ize                 |          |             | Yes        |            | Global    | No      |
| innodb_page_s<br>ize                 | Yes      | Yes         | Yes        |            | Global    | No      |
| Innodb_pages_c<br>reated             |          |             | Yes        |            | Global    | No      |
| Innodb_pages_r<br>ead                |          |             | Yes        |            | Global    | No      |
| Innodb_pages_w<br>ritten             |          |             | Yes        |            | Global    | No      |
| innodb_parallel<br>Threads           | Yes      | Yes         | Yes        |            | Session   | Yes     |
| innodb_print_a<br>ldeadlocks         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_print_d<br>eadlocks           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_purge_b<br>atch_size          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_purge_b<br>atch_truncate      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_purge_b<br>atch_truncate      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_purge_b<br>atches             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_random_b<br>atch_ahead        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_read_a<br>head_threshold      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_read_id<br>breads             | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_read_o<br>nes                 | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_redo_lo<br>g_archive_dirs     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_redo_lo<br>g_capacity         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Innodb_redo_lo<br>g_capacity_resized |          |             | Yes        |            | Global    | No      |
| Innodb_redo_lo<br>g_checkpoint_lsn   |          |             | Yes        |            | Global    | No      |

| Name                                  | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Innodb_redo_log_current_lsn           |          |             |            | Yes        | Global    | No      |
| Innodb_redo_log_enabled               |          |             |            | Yes        | Global    | No      |
| innodb_redo_log_encrypt               | Yes      | Yes         |            |            | Global    | Yes     |
| Innodb_redo_logFlushed_to_disk_lsn    |          |             |            | Yes        | Global    | No      |
| Innodb_redo_log_logical_size          |          |             |            | Yes        | Global    | No      |
| Innodb_redo_log_physical_size         |          |             |            | Yes        | Global    | No      |
| Innodb_redo_log_read_only             |          |             |            | Yes        | Global    | No      |
| Innodb_redo_log_resize_status         |          |             |            | Yes        | Global    | No      |
| Innodb_redo_log_uuid                  |          |             |            | Yes        | Global    | No      |
| innodb_replicaYes_delay               | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_rollbackYes_timeout            | Yes      | Yes         |            |            | Global    | No      |
| innodb_rollbackSegments               | Yes      | Yes         |            |            | Global    | Yes     |
| Innodb_row_lock_current_waits         |          |             |            | Yes        | Global    | No      |
| Innodb_row_lock_time                  |          |             |            | Yes        | Global    | No      |
| Innodb_row_lock_time_avg              |          |             |            | Yes        | Global    | No      |
| Innodb_row_lock_time_max              |          |             |            | Yes        | Global    | No      |
| Innodb_row_lock_waits                 |          |             |            | Yes        | Global    | No      |
| Innodb_rows_deleted                   |          |             |            | Yes        | Global    | No      |
| Innodb_rows_inserted                  |          |             |            | Yes        | Global    | No      |
| Innodb_rows_read                      |          |             |            | Yes        | Global    | No      |
| Innodb_rows_updated                   |          |             |            | Yes        | Global    | No      |
| innodb_savedPage_numberYesbug         | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_segmentReserve_factor          | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_sort_buffersize                | Yes      | Yes         |            |            | Global    | No      |
| innodb_spinWYesdelay                  | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_spinWYespause_multYesper       | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsAYes_recalc               | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsIYes_deleteYesmarked      | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsMethod                    | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsOnYesmetadata             | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsPYesistent                | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsPYesistent_sampleYespages | Yes      | Yes         |            |            | Global    | Yes     |
| innodb_statsTYesistent_sampleYespages | Yes      | Yes         |            |            | Global    | Yes     |
| innodb-status-file                    | Yes      | Yes         |            |            |           |         |
| innodb_statusYYesput                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_statusYYesput_locks            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_strictMYes                     | Yes      | Yes         | Yes        |            | Both      | Yes     |
| innodb_syncAYes_size                  | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_syncCYes                       | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_syncSYes_loops                 | Yes      | Yes         | Yes        |            | Global    | Yes     |

| Name                             | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------|----------|-------------|------------|------------|-----------|---------|
| Innodb_system_rows_deleted       |          |             |            | Yes        | Global    | No      |
| Innodb_system_rows_inserted      |          |             |            | Yes        | Global    | No      |
| Innodb_system_rows_read          |          |             |            | Yes        | Global    | No      |
| innodb_table_yes                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| innodb_temp_yes_file_path        | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_temp_tablespaces_dir      | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_thread_yes_concurrency    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_thread_yes_sep_delay      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_tmpdir                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Innodb_truncated_status_writes   |          |             |            | Yes        | Global    | No      |
| innodb_trx_purges_view_update    | Yes      | Yes         | only_debug | Yes        | Global    | Yes     |
| innodb_trx_rse_slots_debug       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_undo_directory            | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_undo_encrypt              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_undo_log_truncate         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_undo_tablespaces          | Yes      | Yes         | Yes        |            | Global    | Varies  |
| Innodb_undo_tablespaces_active   |          |             |            | Yes        | Global    | No      |
| Innodb_undo_tablespaces_explicit |          |             |            | Yes        | Global    | No      |
| Innodb_undo_tablespaces_implicit |          |             |            | Yes        | Global    | No      |
| Innodb_undo_tablespaces_total    |          |             |            | Yes        | Global    | No      |
| innodb_use_fsync                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| innodb_use_nosync_aio            | Yes      | Yes         | Yes        |            | Global    | No      |
| innodb_validate_tablespace_paths | Yes      | Yes         | Paths      | Yes        | Global    | No      |
| innodb_version                   |          |             | Yes        |            | Global    | No      |
| innodb_write_iostreams           | Yes      | Yes         | Yes        |            | Global    | No      |
| insert_id                        |          |             | Yes        |            | Session   | Yes     |
| install                          | Yes      |             |            |            |           |         |
| install-manual                   | Yes      |             |            |            |           |         |
| interactive_time                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| internal_tmp_dbs_storage_engine  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| internal_tmp_mys_storage_engine  | Yes      | Yes         | Yes        |            | Both      | Yes     |
| join_buffer_size                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| keep_files_on_create             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Key_blocks_not_flushed           |          |             |            | Yes        | Global    | No      |
| Key_blocks_unused                |          |             |            | Yes        | Global    | No      |
| Key_blocks_used                  |          |             |            | Yes        | Global    | No      |
| key_buffer_size                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| key_cache_age_threshold          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| key_cache_blocksize              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| key_cache_div_limit              | Yes      | Yes         | Yes        |            | Global    | Yes     |

| Name                                | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Key_read_requests                   |          |             |            | Yes        | Global    | No      |
| Key_reads                           |          |             |            | Yes        | Global    | No      |
| Key_write_requests                  |          |             |            | Yes        | Global    | No      |
| Key_writes                          |          |             |            | Yes        | Global    | No      |
| keyring_aws_creds_id                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_aws_creds_file              | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_aws_creds_file              | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_aws_region                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_encrypts_file_data          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_encrypts_file_password      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_file_date                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_auth_path         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_ca_path           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_caching           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_commit_auth_path  |          | Yes         |            |            | Global    | No      |
| keyring_hashicorp_commit_ca_path    |          | Yes         |            |            | Global    | No      |
| keyring_hashicorp_commit_caching    |          | Yes         |            |            | Global    | No      |
| keyring_hashicorp_commit_role_id    |          | Yes         |            |            | Global    | No      |
| keyring_hashicorp_commit_server_url |          | Yes         |            |            | Global    | No      |
| keyring_hashicorp_commit_store_path |          | Yes         |            |            | Global    | No      |
| keyring_hashicorp_role_id           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_secret_id         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_server_url        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_hashicorp_store_path        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring-migration-destination       | Yes      | Yes         |            |            |           |         |
| keyring-migration-host              | Yes      | Yes         |            |            |           |         |
| keyring-migration-password          | Yes      | Yes         |            |            |           |         |
| keyring-migration-port              | Yes      | Yes         |            |            |           |         |
| keyring-migration-socket            | Yes      | Yes         |            |            |           |         |
| keyring-migration-source            | Yes      | Yes         |            |            |           |         |
| keyring-migration-to-component      | Yes      | Yes         |            |            |           |         |

| Name                            | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------------|----------|-------------|------------|------------|-----------|---------|
| keyring-migration-user          | Yes      | Yes         |            |            |           |         |
| keyring_oci_ca_certificate      | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_compartment         | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_endpoint            | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_key_file            | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_key_fingerprint     | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_management_endpoint | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_master_key          | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_secrets_endpoint    | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_temporary           | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_use                 | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_vault_endpoint      | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_oci_vault               | Yes      | Yes         | Yes        |            | Global    | No      |
| keyring_okv_credential_dir      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| keyring_operations              |          |             | Yes        |            | Global    | Yes     |
| language                        | Yes      | Yes         | Yes        |            | Global    | No      |
| large_files_support             |          |             | Yes        |            | Global    | No      |
| large_page_size                 |          |             | Yes        |            | Global    | No      |
| large_pages                     | Yes      | Yes         | Yes        |            | Global    | No      |
| last_insert_id                  |          |             | Yes        |            | Session   | Yes     |
| Last_query_cost                 |          |             |            | Yes        | Session   | No      |
| Last_query_partial_plans        |          |             |            | Yes        | Session   | No      |
| lc_messages                     | Yes      | Yes         | Yes        |            | Both      | Yes     |
| lc_messages_dir                 | Yes      | Yes         | Yes        |            | Global    | No      |
| lc_time_names                   | Yes      | Yes         | Yes        |            | Both      | Yes     |
| license                         |          |             | Yes        |            | Global    | No      |
| local_infile                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| local-service                   | Yes      |             |            |            |           |         |
| lock_order                      | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_debt_loop            | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_debt_missing_and     | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_debt_missing_keys    | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_debt_missing_unlock  | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_dependencies         | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_extras_dependencies  | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_out_directory        | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_print_text           | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_tradeloop            | Yes      | Yes         | Yes        |            | Global    | No      |
| lock_order_trademissing_and     | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                                   | Cmd-Line | Option File      | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------------|----------|------------------|------------|------------|-----------|---------|
| lock_order_trace                       | Yes      | missing_key      | Yes        |            | Global    | No      |
| lock_order_trace                       | Yes      | missing_unib     | Yes        |            | Global    | No      |
| lock_wait_timeout                      | Yes      |                  | Yes        |            | Both      | Yes     |
| Locked_connects                        |          |                  |            | Yes        | Global    | No      |
| locked_in_memory                       |          |                  | Yes        |            | Global    | No      |
| log-bin                                | Yes      | Yes              |            |            |           |         |
| log_bin                                |          |                  | Yes        |            | Global    | No      |
| log_bin_basename                       |          |                  | Yes        |            | Global    | No      |
| log_bin_index                          | Yes      | Yes              | Yes        |            | Global    | No      |
| log_bin_trust_function_creators        | Yes      |                  | Yes        |            | Global    | Yes     |
| log_bin_use_vow_events                 | Yes      | Yes              | Yes        |            | Global    | Yes     |
| log_error                              | Yes      | Yes              | Yes        |            | Global    | No      |
| log_error_services                     | Yes      | Yes              | Yes        |            | Global    | Yes     |
| log_error_suppressions                 | Yes      | session_list     | Yes        |            | Global    | Yes     |
| log_error_verbosity                    | Yes      | Yes              | Yes        |            | Global    | Yes     |
| log-isam                               | Yes      | Yes              |            |            |           |         |
| log_output                             | Yes      | Yes              | Yes        |            | Global    | Yes     |
| log_queries_no_indexes                 | Yes      | Yes              | Yes        |            | Global    | Yes     |
| log_raw                                | Yes      | Yes              | Yes        |            | Global    | Yes     |
| log_replica_updates                    | Yes      |                  | Yes        |            | Global    | No      |
| log-short-format                       | Yes      | Yes              |            |            |           |         |
| log_slave_updates                      | Yes      |                  | Yes        |            | Global    | No      |
| log_slow_admin_statements              | Yes      | estatem          | Yes        |            | Global    | Yes     |
| log_slow_extra                         | Yes      |                  | Yes        |            | Global    | Yes     |
| log_slow_replicastements               | Yes      | estatem          | Yes        |            | Global    | Yes     |
| log_slow_slave_statements              | Yes      | estatem          | Yes        |            | Global    | Yes     |
| log_statements                         | Yes      | safefor_b        | Yes        |            | Global    | Yes     |
| log_syslog                             | Yes      |                  | Yes        |            | Global    | Yes     |
| log_syslog_facility                    | Yes      |                  | Yes        |            | Global    | Yes     |
| log_syslog_include_pid                 | Yes      | pid              | Yes        |            | Global    | Yes     |
| log_syslog_tag                         | Yes      |                  | Yes        |            | Global    | Yes     |
| log-tc                                 | Yes      | Yes              |            |            |           |         |
| log-tc-size                            | Yes      | Yes              |            |            |           |         |
| log_throttle_queries_not_using_indexes | Yes      | not_using_indexe | Yes        |            | Global    | Yes     |
| log_timestamps                         | Yes      |                  | Yes        |            | Global    | Yes     |
| long_query_time                        | Yes      |                  | Yes        |            | Both      | Yes     |
| low_priority_updates                   | Yes      |                  | Yes        |            | Both      | Yes     |
| lower_case_file_system                 |          |                  | Yes        |            | Global    | No      |
| lower_case_table_names                 | Yes      | names            | Yes        |            | Global    | No      |
| mandatory_roles                        | Yes      |                  | Yes        |            | Global    | Yes     |

| Name                            | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------------|----------|-------------|------------|------------|-----------|---------|
| master-info-file                | Yes      | Yes         |            |            |           |         |
| master_info_repository          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| master-retry-count              | Yes      | Yes         |            |            |           |         |
| master_verify_checksum          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_allowed_packet              | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_binlog_cache_size           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max-binlog-dump-events          | Yes      | Yes         |            |            |           |         |
| max_binlog_size                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_binlog_stmt_cache_size      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_connect_timeout             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_connections                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_delayed_threads             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_digest_length               | Yes      | Yes         | Yes        |            | Global    | No      |
| max_error_count                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_execution_time              | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Max_execution_time_exceeded     |          |             |            | Yes        | Both      | No      |
| Max_execution_time_set          |          |             |            | Yes        | Both      | No      |
| Max_execution_time_set_failed   |          |             |            | Yes        | Both      | No      |
| max_heap_table_size             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_insert_delayed_threads      |          |             | Yes        |            | Both      | Yes     |
| max_join_size                   | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_length_for_sort_data        | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_points_in_poly              | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_prepared_stmt_count         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_relay_log_size              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| max_seeks_for_key               | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_sort_length                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_sp_recursion_depth          | Yes      | Yes         | Yes        |            | Both      | Yes     |
| Max_used_connections            |          |             |            | Yes        | Global    | No      |
| Max_used_connections_time       |          |             |            | Yes        | Global    | No      |
| max_user_connections            | Yes      | Yes         | Yes        |            | Both      | Yes     |
| max_write_locks                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| mecab_charset                   |          |             |            | Yes        | Global    | No      |
| mecab_rc_file                   | Yes      | Yes         | Yes        |            | Global    | No      |
| memlock                         | Yes      | Yes         |            |            |           |         |
| - Variable:<br>locked_in_memory |          |             |            |            |           |         |
| metadata_locks                  | Yes      | Yes         | Yes        |            | Global    | No      |
| metadata_locks                  | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                                     | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| min_examined_w_limit                     | Yes      | Yes         | Yes        |            | Both      | Yes     |
| myisam-block-size                        | Yes      | Yes         |            |            |           |         |
| myisam_data_size                         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| myisam_max_file_size                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| myisam mmap size                         | Yes      | Yes         | Yes        |            | Global    | No      |
| myisam_recover_options                   | Yes      | Yes         | Yes        |            | Global    | No      |
| myisam_repair_threads                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| myisam_sort_block_size                   | Yes      | Yes         | Yes        |            | Both      | Yes     |
| myisam_stats_method                      | Yes      | Yes         | Yes        |            | Both      | Yes     |
| myisam_use_heap                          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| mysql_firewall_ip                        | Yes      | Yes         | Yes        |            | Global    | Yes     |
| mysql_firewall_port                      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| mysql_native_password_servers            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| mysqlx                                   | Yes      | Yes         |            |            |           |         |
| Mysqlx_aborted_clients                   |          |             |            | Yes        | Global    | No      |
| Mysqlx_address                           |          |             |            | Yes        | Global    | No      |
| Mysqlx_bind_address                      | Yes      | Yes         | Yes        |            | Global    | No      |
| Mysqlx_bytes_received                    |          |             |            | Yes        | Both      | No      |
| Mysqlx_bytes_received_compressed_payload |          |             |            | Yes        | Both      | No      |
| Mysqlx_bytes_received_uncompressed_frame |          |             |            | Yes        | Both      | No      |
| Mysqlx_bytes_sent                        |          |             |            | Yes        | Both      | No      |
| Mysqlx_bytes_sent_compressed_payload     |          |             |            | Yes        | Both      | No      |
| Mysqlx_bytes_sent_uncompressed_frame     |          |             |            | Yes        | Both      | No      |
| Mysqlx_compression_algorithm             |          |             |            | Yes        | Session   | No      |
| mysqlx_compression_algorithm             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Mysqlx_compression_level                 |          |             |            | Yes        | Session   | No      |
| mysqlx_connect_timeout                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Mysqlx_connection_accept_errors          |          |             |            | Yes        | Both      | No      |
| Mysqlx_connection_errors                 |          |             |            | Yes        | Both      | No      |
| Mysqlx_connections_accepted              |          |             |            | Yes        | Global    | No      |
| Mysqlx_connections_closed                |          |             |            | Yes        | Global    | No      |
| Mysqlx_connections_rejected              |          |             |            | Yes        | Global    | No      |
| Mysqlx_crud_create_view                  |          |             |            | Yes        | Both      | No      |
| Mysqlx_crud_delete                       |          |             |            | Yes        | Both      | No      |
| Mysqlx_crud_drop_view                    |          |             |            | Yes        | Both      | No      |
| Mysqlx_crud_find                         |          |             |            | Yes        | Both      | No      |
| Mysqlx_crud_insert                       |          |             |            | Yes        | Both      | No      |
| Mysqlx_crud_modify_view                  |          |             |            | Yes        | Both      | No      |
| Mysqlx_crud_update                       |          |             |            | Yes        | Both      | No      |
| Mysqlx_cursor_close                      |          |             |            | Yes        | Both      | No      |

| Name                                    | Cmd-Line | Option File               | System Var | Status Var | Var Scope | Dynamic |
|-----------------------------------------|----------|---------------------------|------------|------------|-----------|---------|
| Mysqlx_cursor_fetch                     |          |                           |            | Yes        | Both      | No      |
| Mysqlx_cursor_open                      |          |                           |            | Yes        | Both      | No      |
| mysqlx_deflate                          | Yes      | default_compression_level | Yes        |            | Global    | Yes     |
| mysqlx_deflate                          | Yes      | x_client_compress_level   | Yes        |            | Global    | Yes     |
| mysqlx_document                         | Yes      | id_unique_fix             | Yes        |            | Global    | Yes     |
| mysqlx_enable                           | Yes      | hello_notice              | Yes        |            | Global    | Yes     |
| Mysqlx_errors_sent                      |          |                           |            | Yes        | Both      | No      |
| Mysqlx_errors_unknown_message_type      |          |                           |            | Yes        | Both      | No      |
| Mysqlx_expect_close                     |          |                           |            | Yes        | Both      | No      |
| Mysqlx_expect_open                      |          |                           |            | Yes        | Both      | No      |
| mysqlx_idle_timeout                     | Yes      | user_thread_timeout       | Yes        |            | Global    | Yes     |
| Mysqlx_init_error                       |          |                           |            | Yes        | Both      | No      |
| mysqlx_interactive_timeout              | Yes      |                           | Yes        |            | Global    | Yes     |
| mysqlx_lz4_decompress_level             | Yes      | lz4_compression_level     | Yes        |            | Global    | Yes     |
| mysqlx_lz4_max_client_compression_level | Yes      | client_compression_level  | Yes        |            | Global    | Yes     |
| mysqlx_max_allowed_packet               | Yes      | packet                    | Yes        |            | Global    | Yes     |
| mysqlx_max_connections                  | Yes      |                           | Yes        |            | Global    | Yes     |
| Mysqlx_messages_sent                    |          |                           |            | Yes        | Both      | No      |
| mysqlx_min_workers                      | Yes      | threads                   | Yes        |            | Global    | Yes     |
| Mysqlx_notice_global_sent               |          |                           |            | Yes        | Both      | No      |
| Mysqlx_notice_other_sent                |          |                           |            | Yes        | Both      | No      |
| Mysqlx_notice_warning_sent              |          |                           |            | Yes        | Both      | No      |
| Mysqlx_notified_by_group_replication    |          |                           |            | Yes        | Both      | No      |
| Mysqlx_port                             |          |                           |            | Yes        | Global    | No      |
| mysqlx_port                             | Yes      | Yes                       | Yes        |            | Global    | No      |
| mysqlx_port_options                     | Yes      | timeout                   | Yes        |            | Global    | No      |
| Mysqlx_prep_deallocate                  |          |                           |            | Yes        | Both      | No      |
| Mysqlx_prep_execute                     |          |                           |            | Yes        | Both      | No      |
| Mysqlx_prep_prepare                     |          |                           |            | Yes        | Both      | No      |
| mysqlx_read_timeout                     | Yes      |                           | Yes        |            | Session   | Yes     |
| Mysqlx_rows_sent                        |          |                           |            | Yes        | Both      | No      |
| Mysqlx_sessions                         |          |                           |            | Yes        | Global    | No      |
| Mysqlx_sessions_accepted                |          |                           |            | Yes        | Global    | No      |
| Mysqlx_sessions_closed                  |          |                           |            | Yes        | Global    | No      |
| Mysqlx_sessions_fatal_error             |          |                           |            | Yes        | Global    | No      |
| Mysqlx_sessions_killed                  |          |                           |            | Yes        | Global    | No      |
| Mysqlx_sessions_rejected                |          |                           |            | Yes        | Global    | No      |
| Mysqlx_socket                           |          |                           |            | Yes        | Global    | No      |
| mysqlx_socket                           | Yes      | Yes                       | Yes        |            | Global    | No      |
| Mysqlx_ssl_accept_renegotiates          |          |                           |            | Yes        | Global    | No      |
| Mysqlx_ssl_accepts                      |          |                           |            | Yes        | Global    | No      |

| Name                                     | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Mysqlx_ssl_active                        |          |             |            | Yes        | Both      | No      |
| mysqlx_ssl_ca                            | Yes      | Yes         | Yes        |            | Global    | No      |
| mysqlx_ssl_capath                        | Yes      | Yes         | Yes        |            | Global    | No      |
| mysqlx_ssl_cert                          | Yes      | Yes         | Yes        |            | Global    | No      |
| Mysqlx_ssl_cipher                        |          |             |            | Yes        | Both      | No      |
| mysqlx_ssl_cip                           | Yes      | Yes         | Yes        |            | Global    | No      |
| Mysqlx_ssl_cipher_list                   |          |             |            | Yes        | Both      | No      |
| mysqlx_ssl_crlyt                         | Yes      | Yes         | Yes        |            | Global    | No      |
| mysqlx_ssl_crlytlist                     | Yes      | Yes         | Yes        |            | Global    | No      |
| Mysqlx_ssl_ctx_verify_depth              |          |             |            | Yes        | Both      | No      |
| Mysqlx_ssl_ctx_verify_mode               |          |             |            | Yes        | Both      | No      |
| Mysqlx_ssl_finished_accepts              |          |             |            | Yes        | Global    | No      |
| mysqlx_ssl_key                           | Yes      | Yes         | Yes        |            | Global    | No      |
| Mysqlx_ssl_server_not_after              |          |             |            | Yes        | Global    | No      |
| Mysqlx_ssl_server_not_before             |          |             |            | Yes        | Global    | No      |
| Mysqlx_ssl_verify_depth                  |          |             |            | Yes        | Global    | No      |
| Mysqlx_ssl_verify_mode                   |          |             |            | Yes        | Global    | No      |
| Mysqlx_ssl_version                       |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_create_collection            |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_create_collection_index      |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_disable_notices              |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_drop_collection              |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_drop_collection_index        |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_enable_notices               |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_ensure_collection            |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_execute_mysqlx               |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_execute_sql                  |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_execute_xplugin              |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_get_collection_options       |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_kill_client                  |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_list_clients                 |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_list_notices                 |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_list_objects                 |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_modify_collection_options    |          |             |            | Yes        | Both      | No      |
| Mysqlx_stmt_ping                         |          |             |            | Yes        | Both      | No      |
| mysqlx_wait_timeout                      | Yes      | Yes         | Yes        |            | Session   | Yes     |
| Mysqlx_worker_threads                    |          |             |            | Yes        | Global    | No      |
| Mysqlx_worker_threads_active             |          |             |            | Yes        | Global    | No      |
| mysqlx_write_timeout                     | Yes      | Yes         | Yes        |            | Session   | Yes     |
| mysqlx_zstd_default_compression_level    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| mysqlx_zstd_max_client_compression_level | Yes      | Yes         | Yes        |            | Global    | Yes     |

| Name                                         | Cmd-Line | Option File     | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------------------|----------|-----------------|------------|------------|-----------|---------|
| named_pipe                                   | Yes      | Yes             | Yes        |            | Global    | No      |
| named_pipe_files                             | Yes      | access_group    | Yes        |            | Global    | No      |
| ndb_allow_copy                               | Yes      | yes_alter_table | Yes        |            | Both      | Yes     |
| Ndb_api_adaptive_send_deferred_count         |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_deferred_count_replica |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_deferred_count_session |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_deferred_count_slave   |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_forced_count           |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_forced_count_replica   |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_forced_count_session   |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_forced_count_slave     |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_unforced_count         |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_unforced_count_replica |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_unforced_count_session |          |                 |            | Yes        | Global    | No      |
| Ndb_api_adaptive_send_unforced_count_slave   |          |                 |            | Yes        | Global    | No      |
| Ndb_api_bytes_received_count                 |          |                 |            | Yes        | Global    | No      |
| Ndb_api_bytes_received_count_replica         |          |                 |            | Yes        | Global    | No      |
| Ndb_api_bytes_received_count_session         |          |                 |            | Yes        | Session   | No      |
| Ndb_api_bytes_received_count_slave           |          |                 |            | Yes        | Global    | No      |
| Ndb_api_bytes_sent_count                     |          |                 |            | Yes        | Global    | No      |
| Ndb_api_bytes_sent_count_replica             |          |                 |            | Yes        | Global    | No      |
| Ndb_api_bytes_sent_count_session             |          |                 |            | Yes        | Session   | No      |
| Ndb_api_bytes_sent_count_slave               |          |                 |            | Yes        | Global    | No      |
| Ndb_api_event_bytes_count                    |          |                 |            | Yes        | Global    | No      |
| Ndb_api_event_bytes_count_injector           |          |                 |            | Yes        | Global    | No      |
| Ndb_api_event_data_count                     |          |                 |            | Yes        | Global    | No      |
| Ndb_api_event_data_count_injector            |          |                 |            | Yes        | Global    | No      |
| Ndb_api_event_nodata_count                   |          |                 |            | Yes        | Global    | No      |
| Ndb_api_event_nodata_count_injector          |          |                 |            | Yes        | Global    | No      |
| Ndb_api_pk_op_count                          |          |                 |            | Yes        | Global    | No      |
| Ndb_api_pk_op_count_replica                  |          |                 |            | Yes        | Global    | No      |
| Ndb_api_pk_op_count_session                  |          |                 |            | Yes        | Session   | No      |
| Ndb_api_pk_op_count_slave                    |          |                 |            | Yes        | Global    | No      |
| Ndb_api_pruned_scan_count                    |          |                 |            | Yes        | Global    | No      |
| Ndb_api_pruned_scan_count_replica            |          |                 |            | Yes        | Global    | No      |
| Ndb_api_pruned_scan_count_session            |          |                 |            | Yes        | Session   | No      |
| Ndb_api_pruned_scan_count_slave              |          |                 |            | Yes        | Global    | No      |
| Ndb_api_range_scan_count                     |          |                 |            | Yes        | Global    | No      |
| Ndb_api_range_scan_count_replica             |          |                 |            | Yes        | Global    | No      |
| Ndb_api_range_scan_count_session             |          |                 |            | Yes        | Session   | No      |
| Ndb_api_range_scan_count_slave               |          |                 |            | Yes        | Global    | No      |

| Name                                       | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Ndb_api_read_row_count                     |          |             |            | Yes        | Global    | No      |
| Ndb_api_read_row_count_replica             |          |             |            | Yes        | Global    | No      |
| Ndb_api_read_row_count_session             |          |             |            | Yes        | Session   | No      |
| Ndb_api_read_row_count_slave               |          |             |            | Yes        | Global    | No      |
| Ndb_api_scan_batch_count                   |          |             |            | Yes        | Global    | No      |
| Ndb_api_scan_batch_count_replica           |          |             |            | Yes        | Global    | No      |
| Ndb_api_scan_batch_count_session           |          |             |            | Yes        | Session   | No      |
| Ndb_api_scan_batch_count_slave             |          |             |            | Yes        | Global    | No      |
| Ndb_api_table_scan_count                   |          |             |            | Yes        | Global    | No      |
| Ndb_api_table_scan_count_replica           |          |             |            | Yes        | Global    | No      |
| Ndb_api_table_scan_count_session           |          |             |            | Yes        | Session   | No      |
| Ndb_api_table_scan_count_slave             |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_abort_count                  |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_abort_count_replica          |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_abort_count_session          |          |             |            | Yes        | Session   | No      |
| Ndb_api_trans_abort_count_slave            |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_close_count                  |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_close_count_replica          |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_close_count_session          |          |             |            | Yes        | Session   | No      |
| Ndb_api_trans_close_count_slave            |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_commit_count                 |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_commit_count_replica         |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_commit_count_session         |          |             |            | Yes        | Session   | No      |
| Ndb_api_trans_commit_count_slave           |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_local_read_row_count         |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_local_read_row_count_replica |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_local_read_row_count_session |          |             |            | Yes        | Session   | No      |
| Ndb_api_trans_local_read_row_count_slave   |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_start_count                  |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_start_count_replica          |          |             |            | Yes        | Global    | No      |
| Ndb_api_trans_start_count_session          |          |             |            | Yes        | Session   | No      |
| Ndb_api_trans_start_count_slave            |          |             |            | Yes        | Global    | No      |
| Ndb_api_uk_op_count                        |          |             |            | Yes        | Global    | No      |
| Ndb_api_uk_op_count_replica                |          |             |            | Yes        | Global    | No      |
| Ndb_api_uk_op_count_session                |          |             |            | Yes        | Session   | No      |
| Ndb_api_uk_op_count_slave                  |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_exec_complete_count           |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_exec_complete_count_replica   |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_exec_complete_count_session   |          |             |            | Yes        | Session   | No      |
| Ndb_api_wait_exec_complete_count_slave     |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_meta_request_count            |          |             |            | Yes        | Global    | No      |

| Name                                     | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
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| Ndb_api_wait_meta_request_count_replica  |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_meta_request_count_session  |          |             |            | Yes        | Session   | No      |
| Ndb_api_wait_meta_request_count_slave    |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_nanos_count                 |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_nanos_count_replica         |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_nanos_count_session         |          |             |            | Yes        | Session   | No      |
| Ndb_api_wait_nanos_count_slave           |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_scan_result_count           |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_scan_result_count_replica   |          |             |            | Yes        | Global    | No      |
| Ndb_api_wait_scan_result_count_session   |          |             |            | Yes        | Session   | No      |
| Ndb_api_wait_scan_result_count_slave     |          |             |            | Yes        | Global    | No      |
| ndb_applier_all_skip_epoch               | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_autoincrement_prefetch               | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_batch_size                           | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_blob_readbatch_bytes                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_blob_writebatch_bytes                | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_cache_check_time                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_clear_applystatus                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_cluster_connection_pool              | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_cluster_connection_pool_deids        | Yes      | Yes         | Yes        |            | Global    | No      |
| Ndb_cluster_node_id                      |          |             |            | Yes        | Global    | No      |
| Ndb_config_from_host                     |          |             |            | Yes        | Both      | No      |
| Ndb_config_from_port                     |          |             |            | Yes        | Both      | No      |
| Ndb_config_generation                    |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_epoch                    |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_epoch_trans              |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_epoch2                   |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_epoch2_trans             |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_max                      |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_max_del_win              |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_max_del_win_ins          |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_max_ins                  |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_fn_old                      |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_last_conflict_epoch         |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_last_stable_epoch           |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_reflected_op_discard_count  |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_reflected_op_prepare_count  |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_refresh_op_count            |          |             |            | Yes        | Global    | No      |
| ndb_conflict_roles                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Ndb_conflict_trans_conflict_commit_count |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_trans_detect_iter_count     |          |             |            | Yes        | Global    | No      |

| Name                                       | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Ndb_conflict_trans_reject_count            |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_trans_row_conflict_count      |          |             |            | Yes        | Global    | No      |
| Ndb_conflict_trans_row_reject_count        |          |             |            | Yes        | Global    | No      |
| ndb-connectstring                          | Yes      | Yes         |            |            |           |         |
| ndb_data_node_neighbour                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_dbg_checkshares                        | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_default_colnn_format                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_default_colnn_format                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_deferred_constraints                   | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_deferred_constraints                   | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_distribution                           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_distribution                           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Ndb_epoch_delete_delete_count              |          |             |            | Yes        | Global    | No      |
| ndb_eventbuffer_free_percent               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_eventbuffer_max_alloc                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Ndb_execute_count                          |          |             |            | Yes        | Global    | No      |
| ndb_extra_log                              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_force_send                             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_fully_replicated                       | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_index_statable                         | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_index_statoption                       | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_join_pushdown                          |          |             | Yes        |            | Both      | Yes     |
| Ndb_last_commit_epoch_server               |          |             |            | Yes        | Global    | No      |
| Ndb_last_commit_epoch_session              |          |             |            | Yes        | Session   | No      |
| ndb_log_apply_status                       | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_log_apply_status                       | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_log_bin                                | Yes      |             | Yes        |            | Both      | No      |
| ndb_log_binlog_index                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_empty_epochs                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_empty_epochs                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_empty_update                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_empty_update                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_exclusive_reads                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_log_exclusive_reads                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_log_fail_tolerate                      | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_log_orig                               | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_log_orig                               | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_log_transaction_compression            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_transaction_compression_level_zstd | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ndb_log_transaction_dependencies           | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                             | Cmd-Line | Option File          | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------|----------|----------------------|------------|------------|-----------|---------|
| ndb_log_transactions             | Yes      | Yes                  | Yes        |            | Global    | No      |
| ndb_log_transaction_id           |          |                      | Yes        |            | Global    | No      |
| ndb_log_updateless_write         | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| ndb_log_updateminimal            | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| ndb_log_updateonly               | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| Ndb_metadata_blacklist_size      |          |                      |            | Yes        | Global    | No      |
| ndb_metadatacheck                | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| ndb_metadatacheck_interval       | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| Ndb_metadata_detected_count      |          |                      |            | Yes        | Global    | No      |
| Ndb_metadata_excluded_count      |          |                      |            | Yes        | Global    | No      |
| ndb_metadata_sync                |          |                      | Yes        |            | Global    | Yes     |
| Ndb_metadata_synced_count        |          |                      |            | Yes        | Global    | No      |
| ndb-mgmd-host                    | Yes      | Yes                  |            |            |           |         |
| ndb_nodeid                       | Yes      | Yes                  |            | Yes        | Global    | No      |
| Ndb_number_of_data_nodes         |          |                      |            | Yes        | Global    | No      |
| ndb_optimizationdelay            | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| ndb-optimized-node-selection     | Yes      |                      |            |            |           |         |
| ndb_optimized_selection          | Yes      | Yes                  | Yes        |            | Global    | No      |
| Ndb_pruned_scan_count            |          |                      |            | Yes        | Global    | No      |
| Ndb_pushed_queries_defined       |          |                      |            | Yes        | Global    | No      |
| Ndb_pushed_queries_dropped       |          |                      |            | Yes        | Global    | No      |
| Ndb_pushed_queries_executed      |          |                      |            | Yes        | Global    | No      |
| Ndb_pushed_reads                 |          |                      |            | Yes        | Global    | No      |
| ndb_read_backups                 | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| ndb_recv_threads                 | Yes      | activation_threshold | Yes        |            | Global    | Yes     |
| ndb_recv_threads                 | Yes      | cpu_mask             | Yes        |            | Global    | Yes     |
| ndb_replica_bales_size           | Yes      | Yes                  | Yes        |            | Global    | Yes     |
| ndb_replica_baleswrite_batch     | Yes      | bytes                | Yes        |            | Global    | Yes     |
| Ndb_replica_max_replicated_epoch |          |                      | Yes        |            | Global    | No      |
| ndb_report_thres                 | Yes      | binlog_epoch         | Yes        | slip       | Global    | Yes     |
| ndb_report_thres                 | Yes      | binlog_max           | Yes        | usage      | Global    | Yes     |
| ndb_row_checksum                 |          |                      | Yes        |            | Both      | Yes     |
| Ndb_scan_count                   |          |                      |            | Yes        | Global    | No      |
| ndb_schema_drops_lock_wait       | Yes      | out                  | Yes        |            | Global    | Yes     |
| ndb_schema_drops_timeout         | Yes      |                      | Yes        |            | Global    | No      |
| ndb_schema_drops_timeout         | Yes      |                      | Yes        |            | Global    | No      |
| ndb_schema_drops_upgrade_allowed | Yes      |                      | Yes        |            | Global    | No      |
| ndb_show_foreign_key_mockables   | Yes      | Yes                  | Yes        |            | Global    | Yes     |

| Name                             | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------|----------|-------------|------------|------------|-----------|---------|
| ndb_slave_com_Yes_role           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Ndb_slave_max_replicated_epoch   |          |             |            | Yes        | Global    | No      |
| Ndb_system_name                  |          |             | Yes        |            | Global    | No      |
| ndb_table_no_logging             |          |             | Yes        |            | Session   | Yes     |
| ndb_table_temporary              |          |             | Yes        |            | Session   | Yes     |
| Ndb_trans_hint_count_session     |          |             |            | Yes        | Both      | No      |
| ndb-transid-mysql-connection-map | Yes      |             |            |            |           |         |
| ndb_use_copying_alter_table      |          |             | Yes        |            | Both      | No      |
| ndb_use_exact_count              |          |             | Yes        |            | Both      | Yes     |
| ndb_use_transactions             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ndb_version                      |          |             | Yes        |            | Global    | No      |
| ndb_version_string               |          |             | Yes        |            | Global    | No      |
| ndb_wait_connected               | Yes      | Yes         | Yes        |            | Global    | No      |
| ndb_wait_setup                   | Yes      | Yes         | Yes        |            | Global    | No      |
| ndbcluster                       | Yes      | Yes         |            |            |           |         |
| ndbinfo                          | Yes      |             |            |            |           |         |
| ndbinfo_database                 |          |             | Yes        |            | Global    | No      |
| ndbinfo_max_bytes                | Yes      |             | Yes        |            | Both      | Yes     |
| ndbinfo_max_rows                 | Yes      |             | Yes        |            | Both      | Yes     |
| ndbinfo_offline                  |          |             | Yes        |            | Global    | Yes     |
| ndbinfo_show_index               | Yes      |             | Yes        |            | Both      | Yes     |
| ndbinfo_table_prefix             |          |             | Yes        |            | Global    | No      |
| ndbinfo_version                  |          |             | Yes        |            | Global    | No      |
| net_buffer_length                | Yes      | Yes         | Yes        |            | Both      | Yes     |
| net_read_timeout                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| net_retry_count                  | Yes      | Yes         | Yes        |            | Both      | Yes     |
| net_write_timeout                | Yes      | Yes         | Yes        |            | Both      | Yes     |
| new                              | Yes      | Yes         | Yes        |            | Both      | Yes     |
| ngram_token_size                 | Yes      | Yes         | Yes        |            | Global    | No      |
| no-dd-upgrade                    | Yes      | Yes         |            |            |           |         |
| no-defaults                      | Yes      |             |            |            |           |         |
| no-monitor                       | Yes      | Yes         |            |            |           |         |
| Not_flushed_delayed_rows         |          |             |            | Yes        | Global    | No      |
| offline_mode                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| old                              | Yes      | Yes         | Yes        |            | Global    | No      |
| old.Alter_table                  | Yes      | Yes         | Yes        |            | Both      | Yes     |
| old-style-user-limits            | Yes      | Yes         |            |            |           |         |

| Name                                               | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Ongoing_anonymous_gtid_violating_transaction_count |          |             |            | Yes        | Global    | No      |
| Ongoing_anonymous_transaction_count                |          |             |            | Yes        | Global    | No      |
| Ongoing_automatic_gtid_violating_transaction_count |          |             |            | Yes        | Global    | No      |
| Open_files                                         |          |             |            | Yes        | Global    | No      |
| open_files_limit                                   | Yes      | Yes         | Yes        |            | Global    | No      |
| Open_streams                                       |          |             |            | Yes        | Global    | No      |
| Open_table_definitions                             |          |             |            | Yes        | Global    | No      |
| Open_tables                                        |          |             |            | Yes        | Both      | No      |
| Opened_files                                       |          |             |            | Yes        | Global    | No      |
| Opened_table_definitions                           |          |             |            | Yes        | Both      | No      |
| Opened_tables                                      |          |             |            | Yes        | Both      | No      |
| optimizer_prune_level                              | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_search_depth                             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_switches                                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_trace                                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_trace_features                           | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_trace_init                               | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_trace_max_mem_size                       | Yes      | Yes         | Yes        |            | Both      | Yes     |
| optimizer_trace_offset                             | Yes      | Yes         | Yes        |            | Both      | Yes     |
| original_commit_timestamp                          |          |             | Yes        |            | Session   | Yes     |
| original_server_version                            |          |             | Yes        |            | Session   | Yes     |
| parser_max_messages_size                           | Yes      | Yes         | Yes        |            | Both      | Yes     |
| partial_revokes                                    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| password_history                                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| password_requires_current                          | Yes      | Yes         | Yes        |            | Global    | Yes     |
| password_reuse_interval                            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| performance_schema                                 | Yes      | Yes         | Yes        |            | Global    | No      |
| Performance_schema_accounts_lost                   |          |             |            | Yes        | Global    | No      |
| performance_schema_accounts_size                   |          | Yes         |            |            | Global    | No      |
| Performance_schema_cond_classes_lost               |          |             |            | Yes        | Global    | No      |
| Performance_schema_cond_instances_lost             |          |             |            | Yes        | Global    | No      |
| performance-schema-consumer-events-stages-current  | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-stages-history  | Yes      | Yes         |            |            |           |         |

| Name                                                         | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| performance-schema-consumer-events-stages-history-long       | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-statements-cpu            | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-statements-current        | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-statements-history        | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-statements-history-long   | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-transactions-current      | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-transactions-history      | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-transactions-history-long | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-waits-current             | Yes      | Yes         |            |            |           |         |

| Name                                                     | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|----------------------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| performance-schema-consumer-events-waits-history         | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-events-waits-history-long    | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-global-instrumentation       | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-statements-digest            | Yes      | Yes         |            |            |           |         |
| performance-schema-consumer-thread-instrumentation       | Yes      | Yes         |            |            |           |         |
| Performance_schema_digest_lost                           |          |             |            | Yes        | Global    | No      |
| performance_schema_digests_size                          | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_error_size                            | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_aggregates_history_long_size   | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_aggregates_history_size        | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_statements_history_long_size   | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_statements_size                | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_transactions_history_long_size | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_transactions_size              | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_waits_history_long_size        | Yes      | Yes         | Yes        |            | Global    | No      |
| performance_schema_events_waits_size                     | Yes      | Yes         | Yes        |            | Global    | No      |
| Performance_schema_file_classes_lost                     |          |             |            | Yes        | Global    | No      |
| Performance_schema_file_handles_lost                     |          |             |            | Yes        | Global    | No      |
| Performance_schema_file_instances_lost                   |          |             |            | Yes        | Global    | No      |
| Performance_schema_hosts_lost                            |          |             |            | Yes        | Global    | No      |
| performance_schema_hosts_size                            | Yes      | Yes         | Yes        |            | Global    | No      |
| Performance_schema_index_stat_lost                       |          |             |            | Yes        | Global    | No      |
| performance-schema-instrument                            | Yes      | Yes         |            |            |           |         |
| Performance_schema_locker_lost                           |          |             |            | Yes        | Global    | No      |
| performance_schema_max_classes                           | Yes      | Yes         | Yes        |            | Global    | No      |

| Name                                                   | Cmd-Line | Option File | System Var | Status Var    | Var Scope | Dynamic |
|--------------------------------------------------------|----------|-------------|------------|---------------|-----------|---------|
| performance_st_yesma_max_cursors                       | Yes      | Yes         | instances  | Yes           | Global    | No      |
| performance_st_yesma_max_digest_length                 | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_digest_sample_size            | Yes      |             |            | Yes           | Global    | Yes     |
| performance_st_yesma_max_file_classes                  | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_handles                       | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_instances                     | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_index_stat                    | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_memory_classes                | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_metadata_locks                | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_mx_classes                    | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_my_instances                  | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_prepared_statements_instances | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_program_instances             | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_rwlock_classes                | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_rwlock_instances              | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_sockets_classes               | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_sockets_instances             | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_sqlexec_length                | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_stage_classes                 | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_statement_classes             | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_statement_stack               | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_threads_handles               | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_threads_instances             | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_thread_lock_stat              | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_thread_classes                | Yes      |             |            | Yes           | Global    | No      |
| performance_st_yesma_max_thread_instances              | Yes      |             |            | Yes           | Global    | No      |
| Performance_schema_memory_classes_lost                 |          |             |            | Yes           | Global    | No      |
| Performance_schema_metadata_lock_lost                  |          |             |            | Yes           | Global    | No      |
| Performance_schema_mutex_classes_lost                  |          |             |            | Yes           | Global    | No      |
| Performance_schema_mutex_instances_lost                |          |             |            | Yes           | Global    | No      |
| Performance_schema_nested_statement_lost               |          |             |            | Yes           | Global    | No      |
| Performance_schema_prepared_statements_lost            |          |             |            | Yes           | Global    | No      |
| Performance_schema_program_lost                        |          |             |            | Yes           | Global    | No      |
| Performance_schema_rwlock_classes_lost                 |          |             |            | Yes           | Global    | No      |
| Performance_schema_rwlock_instances_lost               |          |             |            | Yes           | Global    | No      |
| Performance_schema_session_connect_attrs_longest_seen  |          |             |            | Yes           | Global    | No      |
| Performance_schema_session_connect_attrs_lost          |          |             |            | Yes           | Global    | No      |
| performance_st_yesma_session_connect_attrs_size        | Yes      |             |            | size          | Global    | No      |
| performance_st_yesma_setup_procs_size                  | Yes      |             |            | size          | Global    | No      |
| performance_st_yesma_setup_objects_size                | Yes      |             |            | size          | Global    | No      |
| performance_st_yesma_show_processeslist                | Yes      |             |            | processeslist | Global    | Yes     |

| Name                                      | Cmd-Line | Option File         | System Var | Status Var | Var Scope | Dynamic |
|-------------------------------------------|----------|---------------------|------------|------------|-----------|---------|
| Performance_schema_socket_classes_lost    |          |                     |            | Yes        | Global    | No      |
| Performance_schema_socket_instances_lost  |          |                     |            | Yes        | Global    | No      |
| Performance_schema_stage_classes_lost     |          |                     |            | Yes        | Global    | No      |
| Performance_schema_statement_classes_lost |          |                     |            | Yes        | Global    | No      |
| Performance_schema_table_handles_lost     |          |                     |            | Yes        | Global    | No      |
| Performance_schema_table_instances_lost   |          |                     |            | Yes        | Global    | No      |
| Performance_schema_table_lock_stat_lost   |          |                     |            | Yes        | Global    | No      |
| Performance_schema_thread_classes_lost    |          |                     |            | Yes        | Global    | No      |
| Performance_schema_thread_instances_lost  |          |                     |            | Yes        | Global    | No      |
| Performance_schema_users_lost             |          |                     |            | Yes        | Global    | No      |
| performance_schema_users_yes              | Yes      | Yes                 | Yes        |            | Global    | No      |
| persist_only_adress_x509_subject          | Yes      | Yes                 | Yes        |            | Global    | No      |
| persist_sensitive_variables_in_binlog     | Yes      | variables_in_binlog | Yes        |            | Global    | No      |
| persisted_globals_load                    | Yes      | load                | Yes        | Yes        | Global    | No      |
| pid_file                                  | Yes      | Yes                 | Yes        |            | Global    | No      |
| plugin_dir                                | Yes      | Yes                 | Yes        |            | Global    | No      |
| plugin-load                               | Yes      | Yes                 |            |            |           |         |
| plugin-load-add                           | Yes      | Yes                 |            |            |           |         |
| plugin-xxx                                | Yes      | Yes                 |            |            |           |         |
| port                                      | Yes      | Yes                 | Yes        |            | Global    | No      |
| port-open-timeout                         | Yes      | Yes                 |            |            |           |         |
| preload_buffer                            | Yes      | Yes                 | Yes        |            | Both      | Yes     |
| Prepared_stmt_count                       |          |                     |            | Yes        | Global    | No      |
| print-defaults                            | Yes      |                     |            |            |           |         |
| print_identified_values_as_hex            | Yes      | Yes                 | Yes        |            | Both      | Yes     |
| profiling                                 |          |                     | Yes        |            | Both      | Yes     |
| profiling_history_size                    | Yes      | size                | Yes        |            | Both      | Yes     |
| protocol_compression_algorithms           | Yes      | algorithms          | Yes        |            | Global    | Yes     |
| protocol_version                          |          |                     | Yes        |            | Global    | No      |
| proxy_user                                |          |                     | Yes        |            | Session   | No      |
| pseudo_replica_mode                       |          |                     | Yes        |            | Session   | Yes     |
| pseudo_slave_mode                         |          |                     | Yes        |            | Session   | Yes     |
| pseudo_thread_id                          |          |                     | Yes        |            | Session   | Yes     |
| Queries                                   |          |                     |            | Yes        | Both      | No      |
| query_alloc_block_size                    | Yes      | size                | Yes        |            | Both      | Yes     |
| query_prealloc_size                       | Yes      | size                | Yes        |            | Both      | Yes     |
| Questions                                 |          |                     |            | Yes        | Both      | No      |
| rand_seed1                                |          |                     | Yes        |            | Session   | Yes     |
| rand_seed2                                |          |                     | Yes        |            | Session   | Yes     |

| Name                                    | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-----------------------------------------|----------|-------------|------------|------------|-----------|---------|
| range_alloc_blocks_size                 | Yes      | Yes         | Yes        |            | Both      | Yes     |
| range_optimizer_max_mem_size            | Yes      | Yes         | Yes        |            | Both      | Yes     |
| rbr_exec_mode                           |          |             | Yes        |            | Session   | Yes     |
| read_buffer_size                        | Yes      | Yes         | Yes        |            | Both      | Yes     |
| read_only                               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| read_rnd_buffer_size                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| regexp_stack_size                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| regexp_time_limit                       | Yes      | Yes         | Yes        |            | Global    | Yes     |
| relay_log                               | Yes      | Yes         | Yes        |            | Global    | No      |
| relay_log_basename                      |          |             | Yes        |            | Global    | No      |
| relay_log_index                         | Yes      | Yes         | Yes        |            | Global    | No      |
| relay_log_info                          | Yes      | Yes         | Yes        |            | Global    | No      |
| relay_log_info_repository               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| relay_log_purge                         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| relay_log_recovery                      | Yes      | Yes         | Yes        |            | Global    | No      |
| relay_log_space_limit                   | Yes      | Yes         | Yes        |            | Global    | No      |
| remove                                  | Yes      |             |            |            |           |         |
| replica_allow_caching                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_checkpoint_group                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_checkpoint_period               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_compressed_protocol             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_exec_nodename                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_load_tabledir                   | Yes      | Yes         | Yes        |            | Global    | No      |
| replica_max_allowed_packet              | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_net_timeout                     | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Replica_open_temp_tables                |          |             |            | Yes        | Global    | No      |
| replica_parallel_workers                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_parallel_workers                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_pending_jobs_size_max           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_preserve_commit_order           | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Replica_rows_last_search_algorithm_used |          |             |            | Yes        | Global    | No      |
| replica_skip_errors                     | Yes      | Yes         | Yes        |            | Global    | No      |
| replica_sql_verify_checksum             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_transactions_retries            | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replica_type_conversions                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| replicate-do-db                         | Yes      | Yes         |            |            |           |         |
| replicate-do-table                      | Yes      | Yes         |            |            |           |         |
| replicate-ignore-db                     | Yes      | Yes         |            |            |           |         |

| Name                                                   | Cmd-Line | Option File | System Var    | Status Var | Var Scope | Dynamic |
|--------------------------------------------------------|----------|-------------|---------------|------------|-----------|---------|
| replicate-ignore-table                                 | Yes      | Yes         |               |            |           |         |
| replicate-rewrite-db                                   | Yes      | Yes         |               |            |           |         |
| replicate-same-server-id                               | Yes      | Yes         |               |            |           |         |
| replicate-wild-do-table                                | Yes      | Yes         |               |            |           |         |
| replicate-wild-ignore-table                            | Yes      | Yes         |               |            |           |         |
| replication_optimize_for_static                        | Yes      | Yes         | plugin_config | Yes        | Global    | Yes     |
| replication_send                                       | Yes      | Yes         | observe_dml   | Yes        | Global    | Yes     |
| report_host                                            | Yes      | Yes         | Yes           |            | Global    | No      |
| report_password                                        | Yes      | Yes         | Yes           |            | Global    | No      |
| report_port                                            | Yes      | Yes         | Yes           |            | Global    | No      |
| report_user                                            | Yes      | Yes         | Yes           |            | Global    | No      |
| require_row_format                                     |          |             | Yes           |            | Session   | Yes     |
| require_secure_transport                               | Yes      | Yes         | Yes           |            | Global    | Yes     |
| Resource_group_supported                               |          |             |               | Yes        | Global    | No      |
| resultset_metadata                                     |          |             | Yes           |            | Session   | Yes     |
| rewriter_enabled                                       |          |             | Yes           |            | Global    | Yes     |
| rewriter_enabled_for_threads_without_privileges_checks |          |             | Yes           |            | Global    | Yes     |
| Rewriter_number_loaded_rules                           |          |             |               | Yes        | Global    | No      |
| Rewriter_number_reloads                                |          |             |               | Yes        | Global    | No      |
| Rewriter_number_rewritten_queries                      |          |             |               | Yes        | Global    | No      |
| Rewriter_reload_error                                  |          |             |               | Yes        | Global    | No      |
| rewriter_verbose                                       |          |             | Yes           |            | Global    | Yes     |
| rpl_read_size                                          | Yes      | Yes         | Yes           |            | Global    | Yes     |
| Rpl_semi_sync_master_clients                           |          |             |               | Yes        | Global    | No      |
| rpl_semi_sync_master_enable                            | Yes      | Yes         | Yes           |            | Global    | Yes     |
| Rpl_semi_sync_master_net_avg_wait_time                 |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_net_wait_time                     |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_net_waits                         |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_no_times                          |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_no_tx                             |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_status                            |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_timefunc_failures                 |          |             |               | Yes        | Global    | No      |
| rpl_semi_sync_master_timeout                           | Yes      | Yes         | Yes           |            | Global    | Yes     |
| rpl_semi_sync_master_trace                             | Yes      | Yes         | Yes           |            | Global    | Yes     |
| Rpl_semi_sync_master_tx_avg_wait_time                  |          |             |               | Yes        | Global    | No      |
| Rpl_semi_sync_master_tx_wait_time                      |          |             |               | Yes        | Global    | No      |

| Name                                       | Cmd-Line | Option File   | System Var | Status Var | Var Scope | Dynamic |
|--------------------------------------------|----------|---------------|------------|------------|-----------|---------|
| Rpl_semi_sync_master_tx_waits              |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_master_wait_no_slave_count   | Yes      | slave_count   | Yes        | Global     | Yes       |         |
| rpl_semi_sync_master_wait_no_slave         | Yes      | slave         | Yes        | Global     | Yes       |         |
| rpl_semi_sync_master_wait_no_tx            | Yes      | tx            | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_master_wait_pos_backtraverse |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_master_wait_sessions         |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_master_yes_tx                |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_replica_enabled              | Yes      |               | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_replica_status               |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_replica_trace_yes            | Yes      |               | Yes        | Global     | Yes       |         |
| rpl_semi_sync_slave_enabled                | Yes      |               | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_slave_status                 |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_slave_trace_level            | Yes      |               | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_source_clients               |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_source_enabled               | Yes      |               | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_source_net_avg_wait_time     |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_net_wait_time         |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_net_waits             |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_no_times              |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_no_tx                 |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_status                |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_timefunc_failures     |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_source_timeout               | Yes      |               | Yes        | Global     | Yes       |         |
| rpl_semi_sync_source_trace_yes             | Yes      |               | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_source_tx_avg_wait_time      |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_tx_wait_time          |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_tx_waits              |          |               | Yes        | Global     | No        |         |
| rpl_semi_sync_source_wait_no_replica_count | Yes      | replica_count | Yes        | Global     | Yes       |         |
| rpl_semi_sync_source_wait_no_replica       | Yes      | replica       | Yes        | Global     | Yes       |         |
| rpl_semi_sync_source_wait_no_tx            | Yes      | tx            | Yes        | Global     | Yes       |         |
| Rpl_semi_sync_source_wait_pos_backtraverse |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_wait_sessions         |          |               | Yes        | Global     | No        |         |
| Rpl_semi_sync_source_yes_tx                |          |               | Yes        | Global     | No        |         |
| rpl_stop_replica_timeout                   | Yes      | timeout       | Yes        | Global     | Yes       |         |
| rpl_stop_slave_timeout                     | Yes      | timeout       | Yes        | Global     | Yes       |         |
| Rsa_public_key                             |          |               | Yes        | Global     | No        |         |
| safe-user-create                           | Yes      | Yes           |            |            |           |         |
| schema_definition_cache                    | Yes      | cache         | Yes        | Global     | Yes       |         |
| secondary_engine_cost_threshold            |          |               | Yes        | Session    | Yes       |         |
| Secondary_engine_execution_count           |          |               | Yes        | Both       | No        |         |

| Name                                   | Cmd-Line | Option File | System Var | Status Var  | Var Scope | Dynamic |
|----------------------------------------|----------|-------------|------------|-------------|-----------|---------|
| secure_file_priv                       | Yes      | Yes         | Yes        |             | Global    | No      |
| Select_full_join                       |          |             |            | Yes         | Both      | No      |
| Select_full_range_join                 |          |             |            | Yes         | Both      | No      |
| select_into_buffer_size                | Yes      | Yes         | Yes        |             | Both      | Yes     |
| select_into_disksync                   | Yes      | Yes         | Yes        |             | Both      | Yes     |
| select_into_disksync_delay             | Yes      | Yes         | Yes        |             | Both      | Yes     |
| Select_range                           |          |             |            | Yes         | Both      | No      |
| Select_range_check                     |          |             |            | Yes         | Both      | No      |
| Select_scan                            |          |             |            | Yes         | Both      | No      |
| server_id                              | Yes      | Yes         | Yes        |             | Global    | Yes     |
| server_id_bits                         | Yes      | Yes         | Yes        |             | Global    | No      |
| server_uuid                            |          |             | Yes        |             | Global    | No      |
| session_track_yields                   | Yes      | Yes         | Yes        |             | Both      | Yes     |
| session_track_yields_sema              | Yes      | Yes         | Yes        |             | Both      | Yes     |
| session_track_yields_change            | Yes      | Yes         | Yes        |             | Both      | Yes     |
| session_track_yields_system_variables  | Yes      | Yes         | Yes        |             | Both      | Yes     |
| session_track_yields_transaction_info  | Yes      | Yes         | Yes        |             | Both      | Yes     |
| sha256_password_auto_generate_rsa_keys | Yes      | Yes         | Yes        |             | Global    | No      |
| sha256_password_private_key_path       | Yes      | Yes         | Yes        |             | Global    | No      |
| sha256_password_proxy_user             | Yes      | Yes         | Yes        |             | Global    | Yes     |
| sha256_password_public_key_path        | Yes      | Yes         | Yes        |             | Global    | No      |
| shared_memory                          | Yes      | Yes         | Yes        |             | Global    | No      |
| shared_memory_base_name                | Yes      | Yes         | Yes        |             | Global    | No      |
| show_create_table_skip_security_engine | Yes      | Yes         | Yes        |             | Session   | Yes     |
| show_create_table_verbosity            | Yes      | Yes         | Yes        |             | Both      | Yes     |
| show_gipk_in_table_information         | Yes      | Yes         | Yes        | information | Both      | Yes     |
| show_old_temporary_tables              | Yes      | Yes         | Yes        |             | Both      | Yes     |
| show-replica-auth-info                 | Yes      | Yes         |            |             |           |         |
| show-slave-auth-info                   | Yes      | Yes         |            |             |           |         |
| skip-character-set-client-handshake    | Yes      | Yes         |            |             |           |         |
| skip_external_xa                       | Yes      | Yes         | Yes        |             | Global    | No      |
| skip-grant-tables                      | Yes      | Yes         |            |             |           |         |
| skip-host-cache                        | Yes      | Yes         |            |             |           |         |
| skip_name_resolve                      | Yes      | Yes         | Yes        |             | Global    | No      |
| skip_ndbcluster                        | Yes      | Yes         |            |             |           |         |

| Name                                  | Cmd-Line | Option File  | System Var | Status Var | Var Scope | Dynamic |
|---------------------------------------|----------|--------------|------------|------------|-----------|---------|
| skip_networking                       | Yes      | Yes          | Yes        |            | Global    | No      |
| skip-new                              | Yes      | Yes          |            |            |           |         |
| skip_replica_start                    | Yes      | Yes          | Yes        |            | Global    | No      |
| skip_show_database                    | Yes      | Yes          | Yes        |            | Global    | No      |
| skip_slave_start                      | Yes      | Yes          | Yes        |            | Global    | No      |
| skip-ssl                              | Yes      | Yes          |            |            |           |         |
| skip-stack-trace                      | Yes      | Yes          |            |            |           |         |
| slave_allow_bare                      | Yes      | Yes          | Yes        |            | Global    | Yes     |
| slave_checkpoint                      | Yes      | group        | Yes        |            | Global    | Yes     |
| slave_checkpoint_period               | Yes      | period       | Yes        |            | Global    | Yes     |
| slave_compressed_protocol             | Yes      | protocol     | Yes        |            | Global    | Yes     |
| slave_exec_mode                       | Yes      | Yes          | Yes        |            | Global    | Yes     |
| slave_load_tmpdir                     | Yes      | Yes          | Yes        |            | Global    | No      |
| slave_max_allowed_packet              | Yes      | packet       | Yes        |            | Global    | Yes     |
| slave_net_timeout                     | Yes      | Yes          | Yes        |            | Global    | Yes     |
| Slave_open_temp_tables                |          |              |            | Yes        | Global    | No      |
| slave_parallel                        | Yes      | Yes          | Yes        |            | Global    | Yes     |
| slave_parallel_workers                | Yes      | workers      | Yes        |            | Global    | Yes     |
| slave_pending_jobs_size_max           | Yes      | size_max     | Yes        |            | Global    | Yes     |
| slave_preserve_commit_order           | Yes      | commit_order | Yes        |            | Global    | Yes     |
| Slave_rows_last_search_algorithm_used |          |              |            | Yes        | Global    | No      |
| slave_rows_search_algorithms          | Yes      | algorithms   | Yes        |            | Global    | Yes     |
| slave_skip_errors                     | Yes      | Errors       | Yes        |            | Global    | No      |
| slave-sql-verify-checksum             | Yes      |              |            |            |           |         |
| slave_sql_verify_checksum             | Yes      | checksum     | Yes        |            | Global    | Yes     |
| slave_transaction_retries             | Yes      | retries      | Yes        |            | Global    | Yes     |
| slave_type_convensions                | Yes      | convensions  | Yes        |            | Global    | Yes     |
| Slow_launch_threads                   |          |              |            | Yes        | Both      | No      |
| slow_launch_time                      | Yes      | Time         | Yes        |            | Global    | Yes     |
| Slow_queries                          |          |              |            | Yes        | Both      | No      |
| slow_query_log                        | Yes      | Log          | Yes        |            | Global    | Yes     |
| slow_query_log_file                   | Yes      | File         | Yes        |            | Global    | Yes     |
| slow-start-timeout                    | Yes      |              |            |            |           |         |
| socket                                | Yes      | Socket       | Yes        |            | Global    | No      |
| sort_buffer_size                      | Yes      | Size         | Yes        |            | Both      | Yes     |
| Sort_merge_passes                     |          |              |            | Yes        | Both      | No      |
| Sort_range                            |          |              |            | Yes        | Both      | No      |
| Sort_rows                             |          |              |            | Yes        | Both      | No      |

| Name                      | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|---------------------------|----------|-------------|------------|------------|-----------|---------|
| Sort_scan                 |          |             |            | Yes        | Both      | No      |
| source_verify_checksum    | Yes      | Yes         | Yes        |            | Global    | Yes     |
| sporadic-binlog-dump-fail | Yes      | Yes         |            |            |           |         |
| sql_auto_is_null          |          |             | Yes        |            | Both      | Yes     |
| sql_big_selects           |          |             | Yes        |            | Both      | Yes     |
| sql_buffer_result         |          |             | Yes        |            | Both      | Yes     |
| sql_generate_indexkey     | Yes      | Yes         | Yes        |            | Both      | Yes     |
| sql_log_bin               |          |             | Yes        |            | Session   | Yes     |
| sql_log_off               |          |             | Yes        |            | Both      | Yes     |
| sql_mode                  | Yes      | Yes         | Yes        |            | Both      | Yes     |
| sql_notes                 |          |             | Yes        |            | Both      | Yes     |
| sql_quote_show_create     |          |             | Yes        |            | Both      | Yes     |
| sql_replica_skip_counter  |          |             | Yes        |            | Global    | Yes     |
| sql_require_primary_key   | Yes      | Yes         | Yes        |            | Both      | Yes     |
| sql_safe_updates          |          |             | Yes        |            | Both      | Yes     |
| sql_select_limit          |          |             | Yes        |            | Both      | Yes     |
| sql_slave_skip_counter    |          |             | Yes        |            | Global    | Yes     |
| sql_warnings              |          |             | Yes        |            | Both      | Yes     |
| ssl                       | Yes      | Yes         |            |            |           |         |
| Ssl_accept_renegotiates   |          |             |            | Yes        | Global    | No      |
| Ssl_accepts               |          |             |            | Yes        | Global    | No      |
| ssl_ca                    | Yes      | Yes         | Yes        |            | Global    | Varies  |
| Ssl_callback_cache_hits   |          |             |            | Yes        | Global    | No      |
| ssl_capath                | Yes      | Yes         | Yes        |            | Global    | Varies  |
| ssl_cert                  | Yes      | Yes         | Yes        |            | Global    | Varies  |
| Ssl_cipher                |          |             |            | Yes        | Both      | No      |
| ssl_cipher                | Yes      | Yes         | Yes        |            | Global    | Varies  |
| Ssl_cipher_list           |          |             |            | Yes        | Both      | No      |
| Ssl_client_connects       |          |             |            | Yes        | Global    | No      |
| Ssl_connect_renegotiates  |          |             |            | Yes        | Global    | No      |
| ssl_crl                   | Yes      | Yes         | Yes        |            | Global    | Varies  |
| ssl_crlpath               | Yes      | Yes         | Yes        |            | Global    | Varies  |
| Ssl_ctx_verify_depth      |          |             |            | Yes        | Global    | No      |
| Ssl_ctx_verify_mode       |          |             |            | Yes        | Global    | No      |
| Ssl_default_timeout       |          |             |            | Yes        | Both      | No      |
| Ssl_finished_accepts      |          |             |            | Yes        | Global    | No      |
| Ssl_finished_connects     |          |             |            | Yes        | Global    | No      |
| ssl_fips_mode             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| ssl_key                   | Yes      | Yes         | Yes        |            | Global    | Varies  |

| Name                                                             | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|------------------------------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| Ssl_server_not_after                                             |          |             |            | Yes        | Both      | No      |
| Ssl_server_not_before                                            |          |             |            | Yes        | Both      | No      |
| Ssl_session_cache_hits                                           |          |             |            | Yes        | Global    | No      |
| Ssl_session_cache_misses                                         |          |             |            | Yes        | Global    | No      |
| Ssl_session_cache_mode                                           |          |             |            | Yes        | Global    | No      |
| ssl_session_c <del>Yes</del> _mode                               | Yes      | Yes         |            |            | Global    | Yes     |
| Ssl_session_cache_overflows                                      |          |             |            | Yes        | Global    | No      |
| Ssl_session_cache_size                                           |          |             |            | Yes        | Global    | No      |
| Ssl_session_cache_timeout                                        |          |             |            | Yes        | Global    | No      |
| ssl_session_c <del>Yes</del> _timeout                            | Yes      | Yes         |            |            | Global    | Yes     |
| Ssl_session_cache_timeouts                                       |          |             |            | Yes        | Global    | No      |
| Ssl_sessions_reused                                              |          |             |            | Yes        | Session   | No      |
| Ssl_used_session_cache_entries                                   |          |             |            | Yes        | Global    | No      |
| Ssl_verify_depth                                                 |          |             |            | Yes        | Both      | No      |
| Ssl_verify_mode                                                  |          |             |            | Yes        | Both      | No      |
| Ssl_version                                                      |          |             |            | Yes        | Both      | No      |
| standalone                                                       | Yes      | Yes         |            |            |           |         |
| stored_program_c <del>Yes</del> ache                             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| stored_program_c <del>Yes</del> definition_c <del>Yes</del> ache | Yes      | Yes         | Yes        |            | Global    | Yes     |
| super-large-p <del>Yes</del> ages                                | Yes      | Yes         |            |            |           |         |
| super_read_only                                                  | Yes      | Yes         | Yes        |            | Global    | Yes     |
| symbolic-links                                                   | Yes      | Yes         |            |            |           |         |
| sync_binlog                                                      | Yes      | Yes         | Yes        |            | Global    | Yes     |
| sync_master_i <del>Yes</del> mes                                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| sync_relay_log                                                   | Yes      | Yes         | Yes        |            | Global    | Yes     |
| sync_relay_log_i <del>Yes</del> fo                               | Yes      | Yes         | Yes        |            | Global    | Yes     |
| sync_source_i <del>Yes</del> mes                                 | Yes      | Yes         |            |            | Global    | Yes     |
| sysdate-is-now                                                   | Yes      | Yes         |            |            |           |         |
| syseventlog_fac <del>Yes</del> ts                                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| syseventlog_inste <del>Yes</del> pid                             | Yes      | Yes         | Yes        |            | Global    | Yes     |
| syseventlog_tags                                                 | Yes      | Yes         | Yes        |            | Global    | Yes     |
| system_time_zone                                                 |          |             | Yes        |            | Global    | No      |
| table_definition_c <del>Yes</del> ache                           | Yes      | Yes         |            |            | Global    | Yes     |
| table_encryption_c <del>Yes</del> hanges                         | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Table_locks_immediate                                            |          |             |            | Yes        | Global    | No      |
| Table_locks_waited                                               |          |             |            | Yes        | Global    | No      |
| table_open_caches                                                | Yes      | Yes         | Yes        |            | Global    | Yes     |
| Table_open_cache_hits                                            |          |             |            | Yes        | Both      | No      |
| table_open_caches <del>Yes</del> _instances                      | Yes      | Yes         |            |            | Global    | No      |

| Name                                 | Cmd-Line | Option File | System Var   | Status Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|--------------|------------|-----------|---------|
| Table_open_cache_misses              |          |             |              | Yes        | Both      | No      |
| Table_open_cache_overflows           |          |             |              | Yes        | Both      | No      |
| tablespace_definition_cache          | Yes      | Yes         | Yes          |            | Global    | Yes     |
| tc-heuristic-recover                 | Yes      | Yes         |              |            |           |         |
| Tc_log_max_pages_used                |          |             |              | Yes        | Global    | No      |
| Tc_log_page_size                     |          |             |              | Yes        | Global    | No      |
| Tc_log_page_waits                    |          |             |              | Yes        | Global    | No      |
| Telemetry_traces_supported           |          |             |              | Yes        | Global    | No      |
| temptable_max_uses                   | Yes      | map         | Yes          |            | Global    | Yes     |
| temptable_max_use                    | Yes      | map         | Yes          |            | Global    | Yes     |
| temptable_use_uses                   | Yes      | map         | Yes          |            | Global    | Yes     |
| terminology_use_previous             | Yes      | previous    | Yes          |            | Both      | Yes     |
| thread_cache_size                    | Yes      |             | Yes          |            | Global    | Yes     |
| thread_handling                      | Yes      |             | Yes          |            | Global    | No      |
| thread_pool_size                     | Yes      | sthm        | Yes          |            | Global    | No      |
| thread_pool_dedicated_listeners      | Yes      |             | Yes          |            | Global    | No      |
| thread_pool_high_priority_connection | Yes      |             | connection   | Yes        | Both      | Yes     |
| thread_pool_max_active_queries       | Yes      | threads     | Yes          |            | Global    | Yes     |
| thread_pool_max_transactions         | Yes      | limit       | Yes          |            | Global    | Yes     |
| thread_pool_max_unused_threads       | Yes      |             | Threads      | Yes        | Global    | Yes     |
| thread_pool_purge_kickup_timer       | Yes      |             | kickup_timer | Yes        | Global    | Yes     |
| thread_pool_query_threads_per_group  | Yes      |             | group        | Yes        | Global    | Yes     |
| thread_pool_size                     | Yes      |             | Yes          |            | Global    | No      |
| thread_pool_size_limit               | Yes      |             | limit        | Yes        | Global    | Yes     |
| thread_pool_transaction_delay        | Yes      |             | delay        | Yes        | Global    | Yes     |
| thread_stack                         | Yes      |             | Threads      | Yes        | Global    | No      |
| Threads_cached                       |          |             |              | Yes        | Global    | No      |
| Threads_connected                    |          |             |              | Yes        | Global    | No      |
| Threads_created                      |          |             |              | Yes        | Global    | No      |
| Threads_running                      |          |             |              | Yes        | Global    | No      |
| time_zone                            |          |             | Yes          |            | Both      | Yes     |
| timestamp                            |          |             | Yes          |            | Session   | Yes     |
| tls_ciphersuites                     | Yes      |             | Yes          |            | Global    | Yes     |
| Tls_library_version                  |          |             |              | Yes        | Global    | No      |
| tls_version                          | Yes      |             | Yes          |            | Global    | Varies  |
| tmp_table_size                       | Yes      |             | Yes          |            | Both      | Yes     |
| tmpdir                               | Yes      |             | Yes          |            | Global    | No      |
| transaction_alloc_block_size         | Yes      |             | Yes          |            | Both      | Yes     |
| transaction_allow_batching           |          |             | Yes          |            | Session   | Yes     |
| transaction_isolation                | Yes      |             | Yes          |            | Both      | Yes     |

| Name                                          | Cmd-Line | Option File | System Var | Status Var | Var Scope | Dynamic |
|-----------------------------------------------|----------|-------------|------------|------------|-----------|---------|
| transaction_prealloc_size                     | Yes      | Yes         |            |            | Both      | Yes     |
| transaction_readonly                          | Yes      | Yes         |            |            | Both      | Yes     |
| transaction_werset_extraction                 | Yes      | Yes         |            |            | Both      | Yes     |
| unique_checks                                 |          |             | Yes        |            | Both      | Yes     |
| updatable_views_with_limit                    | Yes      | Yes         | Yes        |            | Both      | Yes     |
| upgrade                                       | Yes      | Yes         |            |            |           |         |
| Uptime                                        |          |             |            | Yes        | Global    | No      |
| Uptime_since_flush_status                     |          |             |            | Yes        | Global    | No      |
| use_secondary_engine                          |          |             | Yes        |            | Session   | Yes     |
| user                                          | Yes      | Yes         |            |            |           |         |
| validate-config                               | Yes      | Yes         |            |            |           |         |
| validate-password                             | Yes      | Yes         |            |            |           |         |
| validate_password_check_user_name             | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_dictionary_file             | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_dictionary_file_last_parsed |          |             |            | Yes        | Global    | No      |
| validate_password_dictionary_file_words_count |          |             |            | Yes        | Global    | No      |
| validate_password_length                      | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_mixed_case_count            | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_number_count                | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_policy                      | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_special_chars_count         | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_check_use_same              | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_dictionary                  | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password.dictionary_file_last_parsed |          |             |            | Yes        | Global    | No      |
| validate_password.dictionary_file_words_count |          |             |            | Yes        | Global    | No      |
| validate_password_length                      | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_mixed_case_count            | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_number_count                | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_policy                      | Yes      | Yes         |            |            | Global    | Yes     |
| validate_password_special_chars_count         | Yes      | Yes         |            |            | Global    | Yes     |
| validate-user-plugins                         | Yes      | Yes         |            |            |           |         |
| verbose                                       | Yes      | Yes         |            |            |           |         |
| version                                       |          |             | Yes        |            | Global    | No      |
| version_comment                               |          |             | Yes        |            | Global    | No      |
| version_compile_machine                       |          |             | Yes        |            | Global    | No      |
| version_compile_os                            |          |             | Yes        |            | Global    | No      |
| version_compile_zlib                          |          |             | Yes        |            | Global    | No      |
| version_tokensession                          | Yes      | Yes         | Yes        |            | Both      | Yes     |
| version_tokenssession_number                  | Yes      | Yes         | Yes        |            | Both      | No      |

| Name                 | Cmd-Line | Option File    | System Var | Status Var | Var Scope | Dynamic |
|----------------------|----------|----------------|------------|------------|-----------|---------|
| wait_timeout         | Yes      | Yes            | Yes        |            | Both      | Yes     |
| warning_count        |          |                | Yes        |            | Session   | No      |
| windowing_use        | Yes      | high_precision | Yes        | Yes        | Both      | Yes     |
| xa_detach_on_prepare | 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 Server System Variable Reference

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         | Yes_login       | Yes         | Yes        | Global    | Yes     |
| admin_address              | Yes             | Yes         | Yes        | Global    | No      |
| admin_port                 | Yes             | Yes         | Yes        | Global    | No      |
| admin_ssl_ca               | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_ssl_capath           | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_ssl_cert             | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_ssl_cipher           | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_ssl_crl              | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_ssl_crlpath          | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_ssl_key              | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_tls_ciphers          | Yes             | Yes         | Yes        | Global    | Yes     |
| admin_tls_version          | Yes             | Yes         | Yes        | Global    | Yes     |
| audit_log_buffer           | Yes             | Yes         | Yes        | Global    | No      |
| audit_log_compression      | Yes             | Yes         | Yes        | Global    | No      |
| audit_log_connect          | Yes_policy      | Yes         | Yes        | Global    | Yes     |
| audit_log_current_session  |                 |             | Yes        | Both      | No      |
| audit_log_disable          | Yes             | Yes         | Yes        | Global    | Yes     |
| audit_log_encrypt          | Yes             | Yes         | Yes        | Global    | No      |
| audit_log_exclude          | Yes_accounts    | Yes         | Yes        | Global    | Yes     |
| audit_log_file             | Yes             | Yes         | Yes        | Global    | No      |
| audit_log_filter_id        |                 |             | Yes        | Both      | No      |
| audit_log_flush            |                 |             | Yes        | Global    | Yes     |
| audit_log_format           | Yes             | Yes         | Yes        | Global    | No      |
| audit_log_format_timestamp | Yes_x_timestamp | Yes         | Yes        | Global    | Yes     |

| Name                                          | Cmd-Line | Option File           | System Var | Var Scope | Dynamic |     |
|-----------------------------------------------|----------|-----------------------|------------|-----------|---------|-----|
| audit_log_include                             | Yes      | counts                | Yes        | Global    | Yes     |     |
| audit_log_max_size                            | Yes      |                       | Yes        | Global    | Yes     |     |
| audit_log_password                            | Yes      | history_keep          | Yes        | Global    | Yes     |     |
| audit_log_policy                              | Yes      |                       | Yes        | Global    | No      |     |
| audit_log_prune                               | Yes      | seconds               | Yes        | Global    | Yes     |     |
| audit_log_read_buffer_size                    | Yes      |                       | Yes        | Varies    | Varies  |     |
| audit_log_rotate                              | Yes      | size                  | Yes        | Global    | Yes     |     |
| audit_log_statement_policy                    | Yes      |                       | Yes        | Global    | Yes     |     |
| audit_log_strategy                            | Yes      |                       | Yes        | Global    | No      |     |
| authentication_idp                            | Yes      | sp_id                 | Yes        | Global    | Yes     |     |
| authentication_key                            | Yes      | ros_service_key       | tab        | Yes       | Global  | No  |
| authentication_key                            | Yes      | ros_service_principal |            | Yes       | Global  | Yes |
| authentication_ldapsasl_auth_method_name      | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_bind_base_dn          | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_bind_root             | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_bind_rootpwd          | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_ca_path               | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_group_search_attr     | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_group_search_filter   | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_init_pool             | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_log_status            | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_max_poolsize          | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_referral              | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_server_host           | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_server_port           | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_tls                   | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsasl_user_search_attr      | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_auth_method_name    | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_bind_dn             | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_bind_dn             | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_bind_pwd            | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_ca_path             | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_group_search_attr   | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_group_search_filter | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_init_poolsize       | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_log_status          | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_max_pool_size       | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_referral            | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_server_port         | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_server_port         | Yes      |                       | Yes        | Global    | Yes     |     |
| authentication_ldapsimple_tls                 | Yes      |                       | Yes        | Global    | Yes     |     |

| Name                                        | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|---------------------------------------------|----------|-------------|------------|-----------|---------|
| authentication_idap_simple_user_search_attr | Yes      | Yes         | Yes        | Global    | Yes     |
| authentication_policies                     | Yes      | Yes         | Yes        | Global    | Yes     |
| authentication_windows_log_level            | Yes      | Yes         | Yes        | Global    | No      |
| authentication_windows_use_principal_name   | Yes      | Yes         | Yes        | Global    | No      |
| auto_generate_certs                         | Yes      | Yes         | Yes        | Global    | No      |
| auto_increment_increment                    | Yes      | Yes         | Yes        | Both      | Yes     |
| auto_increment_offset                       | Yes      | Yes         | Yes        | Both      | Yes     |
| autocommit                                  | Yes      | Yes         | Yes        | Both      | Yes     |
| automatic_sp_privileges                     | Yes      | Yes         | Yes        | Global    | Yes     |
| avoid_temporal_upgrade                      | Yes      | Yes         | Yes        | Global    | Yes     |
| back_log                                    | Yes      | Yes         | Yes        | Global    | No      |
| basedir                                     | Yes      | Yes         | Yes        | Global    | No      |
| big_tables                                  | Yes      | Yes         | Yes        | Both      | Yes     |
| bind_address                                | Yes      | Yes         | Yes        | Global    | No      |
| binlog_cache_size                           | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_checksum                             | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_direct_non_transactional_updates     | Yes      | Yes         | Yes        | Both      | Yes     |
| binlog_encryption                           | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_error_action                         | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_expire_logs_seconds                  | Yes      | auto_purge  | Yes        | Global    | Yes     |
| binlog_expire_logs_seconds                  | Yes      | seconds     | Yes        | Global    | Yes     |
| binlog_format                               | Yes      | Yes         | Yes        | Both      | Yes     |
| binlog_group_commit_sync_delay              | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_group_commit_sync_no_delay_count     | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_gtid_simple_recovery                 | Yes      | recovery    | Yes        | Global    | No      |
| binlog_max_flush_queue_time                 | Yes      | queue_time  | Yes        | Global    | Yes     |
| binlog_order_compression                    | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_rotate_endition_master_at_startup    | Yes      | at_startup  | Yes        | Global    | No      |
| binlog_row_event_max_size                   | Yes      | size        | Yes        | Global    | No      |
| binlog_row_image                            | Yes      | Yes         | Yes        | Both      | Yes     |
| binlog_row_metadata                         | Yes      | Yes         | Yes        | Global    | Yes     |
| binlog_row_value_options                    | Yes      | tions       | Yes        | Both      | Yes     |
| binlog_rows_query_log_events                | Yes      | events      | Yes        | Both      | Yes     |
| binlog_stmt_cache_size                      | Yes      | size        | Yes        | Global    | Yes     |
| binlog_transaction_compression              | Yes      | compression | Yes        | Both      | Yes     |
| binlog_transaction_compression_level        | Yes      | level       | Yes        | Both      | Yes     |
| binlog_transaction_dependency_history_size  | Yes      | size        | Yes        | Global    | Yes     |
| binlog_transaction_dependency_tracking      | Yes      | tracking    | Yes        | Global    | Yes     |
| block_encryption_de                         | Yes      | de          | Yes        | Both      | Yes     |
| build_id                                    |          |             | Yes        | Global    | No      |
| bulk_insert_buffer_size                     | Yes      | size        | Yes        | Both      | Yes     |

| Name                                             | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|--------------------------------------------------|----------|-------------|------------|-----------|---------|
| caching_sha2_password_auto_generate_rsa_keys     | Yes      | Yes         | Yes        | Global    | No      |
| caching_sha2_password_digest                     | Yes      | Yes         | Yes        | Global    | No      |
| caching_sha2_password_private_key_path           | Yes      | Yes         | Yes        | Global    | No      |
| caching_sha2_password_public_key_path            | Yes      | Yes         | Yes        | Global    | No      |
| character_set_client                             |          |             | Yes        | Both      | Yes     |
| character_set_connection                         |          |             | Yes        | Both      | Yes     |
| character_set_database<br>(note 1)               |          |             | Yes        | Both      | Yes     |
| character_set_filesystem                         | Yes      | Yes         | Yes        | Both      | Yes     |
| character_set_results                            |          |             | Yes        | Both      | Yes     |
| character_set_server                             | Yes      | Yes         | Yes        | Both      | Yes     |
| character_set_system                             |          |             | Yes        | Global    | No      |
| character_sets_dir                               | Yes      | Yes         | Yes        | Global    | No      |
| check_proxy_user                                 | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_autotune concurrency                       | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_block_ddl                                  | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_buffer_size                                | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_ddl_timeout                                | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_delay_after_data_drop                      | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_donor_timeout                              | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_enable_compression                         | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_max_concurrency                            | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_max_data_bandwidth                         | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_max_network_bandwidth                      | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_ssl_ca                                     | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_ssl_cert                                   | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_ssl_key                                    | Yes      | Yes         | Yes        | Global    | Yes     |
| clone_valid_donor_list                           | Yes      | Yes         | Yes        | Global    | Yes     |
| collation_connection                             |          |             | Yes        | Both      | Yes     |
| collation_database<br>(note 1)                   |          |             | Yes        | Both      | Yes     |
| collation_server                                 | Yes      | Yes         | Yes        | Both      | Yes     |
| completion_type                                  | Yes      | Yes         | Yes        | Both      | Yes     |
| concurrent_insert                                | Yes      | Yes         | Yes        | Global    | Yes     |
| connect_timeout                                  | Yes      | Yes         | Yes        | Global    | Yes     |
| connection_controls failed_connections_threshold | Yes      | Yes         | Yes        | Global    | Yes     |
| connection_controls max_connections              | Yes      | Yes         | Yes        | Global    | Yes     |
| connection_controls min_connections              | Yes      | Yes         | Yes        | Global    | Yes     |
| connection_memory_chunk_size                     | Yes      | Yes         | Yes        | Both      | Yes     |
| connection_memory_limit                          | Yes      | Yes         | Yes        | Both      | Yes     |
| core_file                                        |          |             | Yes        | Global    | No      |

| Name                                          | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|-----------------------------------------------|----------|-------------|------------|-----------|---------|
| create_admin_listener_thread                  | Yes      | Yes         | Yes        | Global    | No      |
| cte_max_recursion_depth                       | Yes      | Yes         | Yes        | Both      | Yes     |
| daemon_memcached_enable_binlog                | Yes      | Yes         | Yes        | Global    | No      |
| daemon_memcached_engine_lib_name              | Yes      | Yes         | Yes        | Global    | No      |
| daemon_memcached_engine_lib_path              | Yes      | Yes         | Yes        | Global    | No      |
| daemon_memcached_option                       | Yes      | Yes         | Yes        | Global    | No      |
| daemon_memcached_r_batch_size                 | Yes      | Yes         | Yes        | Global    | No      |
| daemon_memcached_w_batch_size                 | Yes      | Yes         | Yes        | Global    | No      |
| datadir                                       | Yes      | Yes         | Yes        | Global    | No      |
| debug                                         | Yes      | Yes         | Yes        | Both      | Yes     |
| debug_sync                                    |          |             | Yes        | Session   | Yes     |
| default_authentication_plugin                 | Yes      | Yes         | Yes        | Global    | No      |
| default_collation_for_utf8mb4                 |          |             | Yes        | Both      | Yes     |
| default_password_lifetime                     | Yes      | Yes         | Yes        | Global    | Yes     |
| default_storage_engine                        | Yes      | Yes         | Yes        | Both      | Yes     |
| default_table_encryption                      | Yes      | Yes         | Yes        | Both      | Yes     |
| default_tmp_storage_engine                    | Yes      | Yes         | Yes        | Both      | Yes     |
| default_week_format                           | Yes      | Yes         | Yes        | Both      | Yes     |
| delay_key_write                               | Yes      | Yes         | Yes        | Global    | Yes     |
| delayed_insert_limit                          | Yes      | Yes         | Yes        | Global    | Yes     |
| delayed_insert_timeout                        | Yes      | Yes         | Yes        | Global    | Yes     |
| delayed_queue_size                            | Yes      | Yes         | Yes        | Global    | Yes     |
| disabled_storage_engines                      | Yes      | Yes         | Yes        | Global    | No      |
| disconnect_on_expired_password                | Yes      | Yes         | Yes        | Global    | No      |
| div_precision_increment                       | Yes      | Yes         | Yes        | Both      | Yes     |
| dragnet.log_error_rules                       | Yes      | Yes         | Yes        | Global    | Yes     |
| end_markers_in_json                           | Yes      | Yes         | Yes        | Both      | Yes     |
| enforce_gtid_consistency                      | Yes      | Yes         | Yes        | Global    | Yes     |
| enterprise_encrypt_maximum_rsa_key_size       | Yes      | Yes         | Yes        | Global    | Yes     |
| enterprise_encrypt_rsa_support_legacy_padding | Yes      | Yes         | Yes        | Global    | Yes     |
| eq_range_index_limit                          | Yes      | Yes         | Yes        | Both      | Yes     |
| error_count                                   |          |             | Yes        | Session   | No      |
| event_scheduler                               | Yes      | Yes         | Yes        | Global    | Yes     |
| expire_logs_days                              | Yes      | Yes         | Yes        | Global    | Yes     |
| explain_format                                | Yes      | Yes         | Yes        | Both      | Yes     |
| explicit_defaults_timestamp                   | Yes      | Yes         | Yes        | Both      | Yes     |
| external_user                                 |          |             | Yes        | Session   | No      |
| flush                                         | Yes      | Yes         | Yes        | Global    | Yes     |
| flush_time                                    | Yes      | Yes         | Yes        | Global    | Yes     |
| foreign_key_checks                            |          |             | Yes        | Both      | Yes     |
| ft_boolean_syntax                             | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                               | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|----------------------------------------------------|----------|-------------|------------|-----------|---------|
| ft_max_word_len                                    | Yes      | Yes         | Yes        | Global    | No      |
| ft_min_word_len                                    | Yes      | Yes         | Yes        | Global    | No      |
| ft_query_expansions                                | Yes      | Yes         | Yes        | Global    | No      |
| ft_stopword_file                                   | Yes      | Yes         | Yes        | Global    | No      |
| general_log                                        | Yes      | Yes         | Yes        | Global    | Yes     |
| general_log_file                                   | Yes      | Yes         | Yes        | Global    | Yes     |
| generated_random_password_lengths                  | Yes      | Yes         | Yes        | Both      | Yes     |
| global_connection_memory_limit                     | Yes      | Yes         | Yes        | Global    | Yes     |
| global_connection_memory_tracking                  | Yes      | Yes         | Yes        | Both      | Yes     |
| group_concat_max_len                               | Yes      | Yes         | Yes        | Both      | Yes     |
| group_replication_advertise_recovery_endpoints     | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_allow_local_lowers               | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_auto_increment_increment         | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_restorejoin_tries                | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_bootstrap_group                  | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_change_threshold                 | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_communication_bug_options        | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_communication_message_size       | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_communication_stack              |          |             | Yes        | Global    | No      |
| group_replication_components_stop_timeout          | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_compression_threshold            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_consistency                      | Yes      | Yes         | Yes        | Both      | Yes     |
| group_replication_force_update_everywhere_checks   | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_group_state_action               | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_applies_threshold    | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_center_threshold     | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_holds_percent        | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_max_quota            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_member_quota_percent | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_min_quota            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_min_recovery_quota   | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_modes                | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_percent              | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_control_releases_percent     | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowce_members                    | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowup_name                       | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowup_seeds                      | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowd_assignment_lowlock_size     | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowallowlist                     | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowwhitelist                     | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_lowcal_address                   | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                              | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|---------------------------------------------------|----------|-------------|------------|-----------|---------|
| group_replication_member_expire                   | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_member_weight                   | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_message_cache_size              | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_xos_single_level                | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_ll_spin_loops                   | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_completes_at           | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_compression_algorithm  | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_get_pvt_key            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_public_path            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_recon_interval         | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_retry_time             | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_ca                 | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_ca_path            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_cert               | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_ciphers            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_crly               | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_crly_path          | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_key                | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_ssl_verify_server_cert | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_tls_ciphersuites       | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_tls_version            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_recovery_use_ssl                | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_zstd_compression_level          | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_single_primary_mode             | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_mode                            | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_start_on_boot                   | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_source                          | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_transaction_size_limit          | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_reachable_master_timeout        | Yes      | Yes         | Yes        | Global    | Yes     |
| group_replication_low_change_uvd                  | Yes      | Yes         | Yes        | Global    | Yes     |
| gtid_executed                                     |          |             | Yes        | Global    | No      |
| gtid_executed_compression_period                  | Yes      | Yes         | Yes        | Global    | Yes     |
| gtid_mode                                         | Yes      | Yes         | Yes        | Global    | Yes     |
| gtid_next                                         |          |             | Yes        | Session   | Yes     |
| gtid_owned                                        |          |             | Yes        | Both      | No      |
| gtid_purged                                       |          |             | Yes        | Global    | Yes     |
| have_compress                                     |          |             | Yes        | Global    | No      |
| have_dynamic_loading                              |          |             | Yes        | Global    | No      |
| have_geometry                                     |          |             | Yes        | Global    | No      |
| have_openssl                                      |          |             | Yes        | Global    | No      |
| have_profiling                                    |          |             | Yes        | Global    | No      |

| Name                                 | Cmd-Line         | Option File | System Var | Var Scope | Dynamic |
|--------------------------------------|------------------|-------------|------------|-----------|---------|
| have_query_cache                     |                  |             | Yes        | Global    | No      |
| have_rtree_keys                      |                  |             | Yes        | Global    | No      |
| have_ssl                             |                  |             | Yes        | Global    | No      |
| have_statement_timeout               |                  |             | Yes        | Global    | No      |
| have_symlink                         |                  |             | Yes        | Global    | No      |
| histogram_generate                   | Yes              | Yes_max_mem | Yes        | Both      | Yes     |
| host_cache_size                      | Yes              | Yes         | Yes        | Global    | Yes     |
| hostname                             |                  |             | Yes        | Global    | No      |
| identity                             |                  |             | Yes        | Session   | Yes     |
| immediate_server_version             |                  |             | Yes        | Session   | Yes     |
| information_schema                   | Yes_stats_expiry | Yes         | Yes        | Both      | Yes     |
| init_connect                         | Yes              | Yes         | Yes        | Global    | Yes     |
| init_file                            | Yes              | Yes         | Yes        | Global    | No      |
| init_replica                         | Yes              | Yes         | Yes        | Global    | Yes     |
| init_slave                           | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_adaptive_indexing             | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_adaptive_indexing_lwm         | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_adaptive_indexing_index       | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_adaptive_indexing_index_parts | Yes              | Yes         | Yes        | Global    | No      |
| innodb_adaptive_indexing_sleep_delay | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_api_bk_commit_interval        | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_api_disable_rowlock           | Yes              | Yes         | Yes        | Global    | No      |
| innodb_api_enable_binlog             | Yes              | Yes         | Yes        | Global    | No      |
| innodb_api_enable_xasdnl             | Yes              | Yes         | Yes        | Global    | No      |
| innodb_api_trx_level                 | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_autoextend_increment          | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_autoinc_lock_mode             | Yes              | Yes         | Yes        | Global    | No      |
| innodb_background_purge_at_shutdown  | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_chunk_size        | Yes              | Yes         | Yes        | Global    | No      |
| innodb_buffer_pool_debug             | Yes              | Yes         | Yes        | Global    | No      |
| innodb_buffer_pool_dump_at_shutdown  | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_dump_now          | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_dump_pct          | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_filename          | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_in_core_file      | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_instances         | Yes              | Yes         | Yes        | Global    | No      |
| innodb_buffer_pool_load_abort        | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_load_at_startup   | Yes              | Yes         | Yes        | Global    | No      |
| innodb_buffer_pool_load_now          | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_buffer_pool_size              | Yes              | Yes         | Yes        | Global    | Yes     |
| innodb_change_buffer_max_size        | Yes              | Yes         | Yes        | Global    | Yes     |

| Name                                     | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|------------------------------------------|----------|-------------|------------|-----------|---------|
| innodb_change_buffering                  | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_change_buffering_debug            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_checkpoint_disabled               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_checksum_algorithm                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_cmp_per_index_enabled             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_commit_cbs                        | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_compress_level                    | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_compression_failure_threshold_pct | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_compression_level                 | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_compression_pad_pct_max           | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_concurrency_tickets               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_data_file_path                    | Yes      | Yes         | Yes        | Global    | No      |
| innodb_data_home_dir                     | Yes      | Yes         | Yes        | Global    | No      |
| innodb_ddl_buffer_size                   | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_ddl_log_crash_reset_debug         | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_ddl_thread                        | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_deadlock_detect                   | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_dedicated_server                  | Yes      | Yes         | Yes        | Global    | No      |
| innodb_default_row_format                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_directories                       | Yes      | Yes         | Yes        | Global    | No      |
| innodb_disable_stale_file_cache          | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_doublewrite                       | Yes      | Yes         | Yes        | Global    | Varies  |
| innodb_doublewrite_batch_size            | Yes      | Yes         | Yes        | Global    | No      |
| innodb_doublewrite_dir                   | Yes      | Yes         | Yes        | Global    | No      |
| innodb_doublewrite_files                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_doublewrite_pages                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_extend_auto-initialize            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_fast_shutdown                     | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_file_make_dirty_debug             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_file_per_table                    | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_fill_factor                       | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_flush_log_timeout                 | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_flush_log_trx_commit              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_flush_method                      | Yes      | Yes         | Yes        | Global    | No      |
| innodb_flush_neigbors                    | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_flush_SYNopsis                    | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_flushing_avg_loops                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_force_load_corrupted              | Yes      | Yes         | Yes        | Global    | No      |
| innodb_force_recovery                    | Yes      | Yes         | Yes        | Global    | No      |
| innodb_fsync_threshold                   | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_ft_aux_table                      |          |             | Yes        | Global    | Yes     |

| Name                                 | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|------------|-----------|---------|
| innodb_ft_cache_size                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_ft_enable_diag_print          | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_ft_enable_stopword            | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_ft_max_token_size             | Yes      | Yes         | Yes        | Global    | No      |
| innodb_ft_min_token_size             | Yes      | Yes         | Yes        | Global    | No      |
| innodb_ft_num_word_limit             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_ft_result_limit               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_ft_server_stopword_table      | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_ft_sort_pll_degree            | Yes      | Yes         | Yes        | Global    | No      |
| innodb_ft_total_cache_size           | Yes      | Yes         | Yes        | Global    | No      |
| innodb_ft_user_stopword_table        | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_idle_flush_time               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_io_capacity                   | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_io_capacity_max               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_limit_opt_in_insert_debug     | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_lock_wait_timeout             | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_log_buffer_size               | Yes      | Yes         | Yes        | Global    | Varies  |
| innodb_log_checkpoint_fuzzy_now      | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_checkpoint_now            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_checkpoint_ms             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_compressed_pages          | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_file_size                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_log_files_in_group            | Yes      | Yes         | Yes        | Global    | No      |
| innodb_log_group_home_dir            | Yes      | Yes         | Yes        | Global    | No      |
| innodb_log_spin_abs_lwm              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_spin_pct_hwm              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_wait_flush_spin_hwm       | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_write_ahead_size          | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_log_write_aheads              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_lru_scan_depth                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_max_dirty_pages_pct           | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_max_dirty_pages_pct_lwm       | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_max_purge_lag                 | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_max_purge_lag_delay           | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_max_undo_log_size             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_merge_threshold_set_all_debug | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_monitor_disable               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_monitor_enable                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_monitor_kill                  | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_monitor_kill_all              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_numa_interleave               | Yes      | Yes         | Yes        | Global    | No      |

| Name                                 | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|------------|-----------|---------|
| innodb_old_blocks_pct                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_old_blocks_time               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_online_alter_log_max_size     | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_open_files                    | Yes      | Yes         | Yes        | Global    | Varies  |
| innodb_optimize_text_only            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_page_cleaners                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_page_size                     | Yes      | Yes         | Yes        | Global    | No      |
| innodb_parallel_workers_threads      | Yes      | Yes         | Yes        | Session   | Yes     |
| innodb_print_all_locks               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_print_ddl                     | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_purge_broken_size             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_purge_rseg_truncate_frequency | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_purge_threads                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_random_ahead                  | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_read_ahead_threshold          | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_read_io_threads               | Yes      | Yes         | Yes        | Global    | No      |
| innodb_read_only                     | Yes      | Yes         | Yes        | Global    | No      |
| innodb_redo_log_hive_dirs            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_redo_log_opacity              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_redo_log_encrypt              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_replication_delay             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_rollback_timeout              | Yes      | Yes         | Yes        | Global    | No      |
| innodb_rollback_segments             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_saved_pages_number_debug      | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_segment_reserve_factor        | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_sort_buffer_resize            | Yes      | Yes         | Yes        | Global    | No      |
| innodb_spin_wait_delay               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_spin_wait_pause_multiplier    | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_auto_recalc             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_include_delete_marks    | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_moving                  | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_on_table                | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_persistent              | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_persistent_sample_pages | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_stats_transient_sample_pages  | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_status_output                 | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_status_output_locks           | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_strict_mode                   | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_sync_array_size               | Yes      | Yes         | Yes        | Global    | No      |
| innodb_sync_debug                    | Yes      | Yes         | Yes        | Global    | No      |
| innodb_sync_spinops                  | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                  | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|---------------------------------------|----------|-------------|------------|-----------|---------|
| innodb_table_locks                    | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_temp_date_file_path            | Yes      | Yes         | Yes        | Global    | No      |
| innodb_temp_tablespaces_dir           | Yes      | Yes         | Yes        | Global    | No      |
| innodb_thread_concurrency             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_thread_sleep_delay             | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_tmpdir                         | Yes      | Yes         | Yes        | Both      | Yes     |
| innodb_trx_purge_lsn_update_on_commit | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_trx_rseg_lots_debug            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_undo_directory                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_undo_log_encrypt               | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_undo_log_group_size            | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_undo_tablespaces               | Yes      | Yes         | Yes        | Global    | Varies  |
| innodb_use_fsync                      | Yes      | Yes         | Yes        | Global    | Yes     |
| innodb_use_native_aio                 | Yes      | Yes         | Yes        | Global    | No      |
| innodb_validate_checksum_paths        | Yes      | Yes         | Yes        | Global    | No      |
| innodb_version                        |          |             | Yes        | Global    | No      |
| innodb_write_io_threads               | Yes      | Yes         | Yes        | Global    | No      |
| insert_id                             |          |             | Yes        | Session   | Yes     |
| interactive_timeout                   | Yes      | Yes         | Yes        | Both      | Yes     |
| internal_tmp_disk_storage_engine      | Yes      | Yes         | Yes        | Global    | Yes     |
| internal_tmp_mem_storage_engine       | Yes      | Yes         | Yes        | Both      | Yes     |
| join_buffer_size                      | Yes      | Yes         | Yes        | Both      | Yes     |
| keep_files_on_create                  | Yes      | Yes         | Yes        | Both      | Yes     |
| key_buffer_size                       | Yes      | Yes         | Yes        | Global    | Yes     |
| key_cache_age_threshold               | Yes      | Yes         | Yes        | Global    | Yes     |
| key_cache_block_size                  | Yes      | Yes         | Yes        | Global    | Yes     |
| key_cache_division_limit              | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_aws_cmk                       | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_aws_composite                 | Yes      | Yes         | Yes        | Global    | No      |
| keyring_aws_data                      | Yes      | Yes         | Yes        | Global    | No      |
| keyring_aws_region                    | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_encrypted_file_data           | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_encrypted_file_password       | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_file_data                     | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_hashicorp_auth_path           | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_hashicorp_ca_path             | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_hashicorp_caching             | Yes      | Yes         | Yes        | Global    | Yes     |
| keyring_hashicorp_commit_auth_path    |          |             | Yes        | Global    | No      |
| keyring_hashicorp_commit_ca_path      |          |             | Yes        | Global    | No      |
| keyring_hashicorp_commit_caching      |          |             | Yes        | Global    | No      |
| keyring_hashicorp_commit_role_id      |          |             | Yes        | Global    | No      |

| Name                                | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|-------------------------------------|----------|-------------|------------|-----------|---------|
| keyring_hashicorp_commit_server_url |          | Yes         | Global     | No        |         |
| keyring_hashicorp_commit_store_path |          | Yes         | Global     | No        |         |
| keyring_hashicorp_yesle_id          | Yes      | Yes         | Global     | Yes       |         |
| keyring_hashicorp_yessecret_id      | Yes      | Yes         | Global     | Yes       |         |
| keyring_hashicorp_yesserver_url     | Yes      | Yes         | Global     | Yes       |         |
| keyring_hashicorp_yestore_path      | Yes      | Yes         | Global     | Yes       |         |
| keyring_oci_ca_certificate          | Yes      | Yes         | Global     | No        |         |
| keyring_oci_compart                 | Yes      | Yes         | Global     | No        |         |
| keyring_oci_encryption_endpoint     | Yes      | Yes         | Global     | No        |         |
| keyring_oci_key_Yes                 | Yes      | Yes         | Global     | No        |         |
| keyring_oci_key_Yeserprint          | Yes      | Yes         | Global     | No        |         |
| keyring_oci_management_endpoint     | Yes      | Yes         | Global     | No        |         |
| keyring_oci_masterkey               | Yes      | Yes         | Global     | No        |         |
| keyring_oci_secretyesendpoint       | Yes      | Yes         | Global     | No        |         |
| keyring_oci_tenantYes               | Yes      | Yes         | Global     | No        |         |
| keyring_oci_userYes                 | Yes      | Yes         | Global     | No        |         |
| keyring_oci_vaultYesendpoint        | Yes      | Yes         | Global     | No        |         |
| keyring_oci_virtualYesault          | Yes      | Yes         | Global     | No        |         |
| keyring_okv_confYes                 | Yes      | Yes         | Global     | Yes       |         |
| keyring_operations                  |          |             | Yes        | Global    | Yes     |
| language                            | Yes      | Yes         | Yes        | Global    | No      |
| large_files_support                 |          |             | Yes        | Global    | No      |
| large_page_size                     |          |             | Yes        | Global    | No      |
| large_pages                         | Yes      | Yes         | Yes        | Global    | No      |
| last_insert_id                      |          |             | Yes        | Session   | Yes     |
| lc_messages                         | Yes      | Yes         | Yes        | Both      | Yes     |
| lc_messages_dir                     | Yes      | Yes         | Yes        | Global    | No      |
| lc_time_names                       | Yes      | Yes         | Yes        | Both      | Yes     |
| license                             |          |             | Yes        | Global    | No      |
| local_infile                        | Yes      | Yes         | Yes        | Global    | Yes     |
| lock_order                          | Yes      | Yes         | Yes        | Global    | No      |
| lock_order_debugYesop               | Yes      | Yes         | Global     | No        |         |
| lock_order_debugYesmissing_arc      | Yes      | Yes         | Global     | No        |         |
| lock_order_debugYesmissing_key      | Yes      | Yes         | Global     | No        |         |
| lock_order_debugYesmissing_unlock   | Yes      | Yes         | Global     | No        |         |
| lock_order_dependencies             | Yes      | Yes         | Global     | No        |         |
| lock_order_extrayesdependencies     | Yes      | Yes         | Global     | No        |         |
| lock_order_outputYesirectory        | Yes      | Yes         | Global     | No        |         |
| lock_order_printYes                 | Yes      | Yes         | Global     | No        |         |
| lock_order_traceYesp                | Yes      | Yes         | Global     | No        |         |
| lock_order_traceYesissing_arc       | Yes      | Yes         | Global     | No        |         |

| Name                                   | Cmd-Line | Option File    | System Var | Var Scope | Dynamic |
|----------------------------------------|----------|----------------|------------|-----------|---------|
| lock_order_trace                       | Yes      | Missing_key    | Yes        | Global    | No      |
| lock_order_trace                       | Yes      | Missing_unlock | Yes        | Global    | No      |
| lock_wait_timeout                      | Yes      | Yes            | Yes        | Both      | Yes     |
| locked_in_memory                       |          |                | Yes        | Global    | No      |
| log_bin                                |          |                | Yes        | Global    | No      |
| log_bin_basename                       |          |                | Yes        | Global    | No      |
| log_bin_index                          | Yes      | Yes            | Yes        | Global    | No      |
| log_bin_trust_function_creators        | Yes      | Yes            | Yes        | Global    | Yes     |
| log_bin_use_v1_events                  | Yes      | Yes            | Yes        | Global    | Yes     |
| log_error                              | Yes      | Yes            | Yes        | Global    | No      |
| log_error_services                     | Yes      | Yes            | Yes        | Global    | Yes     |
| log_error_suppress_until_start         | Yes      | Yes            | Yes        | Global    | Yes     |
| log_error_verbosity                    | Yes      | Yes            | Yes        | Global    | Yes     |
| log_output                             | Yes      | Yes            | Yes        | Global    | Yes     |
| log_queries_not_using_indexes          | Yes      | Yes            | Yes        | Global    | Yes     |
| log_raw                                | Yes      | Yes            | Yes        | Global    | Yes     |
| log_replica_updates                    | Yes      | Yes            | Yes        | Global    | No      |
| log_slave_updates                      | Yes      | Yes            | Yes        | Global    | No      |
| log_slow_admin_statements              | Yes      | Yes            | Yes        | Global    | Yes     |
| log_slow_extra                         | Yes      | Yes            | Yes        | Global    | Yes     |
| log_slow_replica_statements            | Yes      | Yes            | Yes        | Global    | Yes     |
| log_slow_slave_statements              | Yes      | Yes            | Yes        | Global    | Yes     |
| log_statements_unsafe_for_binlog       | Yes      | Yes            | Yes        | Global    | Yes     |
| log_syslog                             | Yes      | Yes            | Yes        | Global    | Yes     |
| log_syslog_facility                    | Yes      | Yes            | Yes        | Global    | Yes     |
| log_syslog_include_pid                 | Yes      | Yes            | Yes        | Global    | Yes     |
| log_syslog_tag                         | Yes      | Yes            | Yes        | Global    | Yes     |
| log_throttle_queries_not_using_indexes | Yes      | Yes            | Yes        | Global    | Yes     |
| log_timestamps                         | Yes      | Yes            | Yes        | Global    | Yes     |
| long_query_time                        | Yes      | Yes            | Yes        | Both      | Yes     |
| low_priority_updates                   | Yes      | Yes            | Yes        | Both      | Yes     |
| lower_case_file_system                 |          |                | Yes        | Global    | No      |
| lower_case_table_names                 | Yes      | Yes            | Yes        | Global    | No      |
| mandatory_roles                        | Yes      | Yes            | Yes        | Global    | Yes     |
| master_info_repository                 | Yes      | Yes            | Yes        | Global    | Yes     |
| master_verify_checksum                 | Yes      | Yes            | Yes        | Global    | Yes     |
| max_allowed_packet                     | Yes      | Yes            | Yes        | Both      | Yes     |
| max_binlog_cache_size                  | Yes      | Yes            | Yes        | Global    | Yes     |
| max_binlog_size                        | Yes      | Yes            | Yes        | Global    | Yes     |
| max_binlog_stmt_size                   | Yes      | Yes            | Yes        | Global    | Yes     |
| max_connect_errors                     | Yes      | Yes            | Yes        | Global    | Yes     |

| Name                                        | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|---------------------------------------------|----------|-------------|------------|-----------|---------|
| max_connections                             | Yes      | Yes         | Yes        | Global    | Yes     |
| max_delayed_threads                         | Yes      | Yes         | Yes        | Both      | Yes     |
| max_digest_length                           | Yes      | Yes         | Yes        | Global    | No      |
| max_error_count                             | Yes      | Yes         | Yes        | Both      | Yes     |
| max_execution_time                          | Yes      | Yes         | Yes        | Both      | Yes     |
| max_heap_table_size                         | Yes      | Yes         | Yes        | Both      | Yes     |
| max_insert_delayed_threads                  |          |             | Yes        | Both      | Yes     |
| max_join_size                               | Yes      | Yes         | Yes        | Both      | Yes     |
| max_length_for_sort_data                    | Yes      | Yes         | Yes        | Both      | Yes     |
| max_points_in_geospatial                    | Yes      | Yes         | Yes        | Both      | Yes     |
| max_prepared_stmt_count                     | Yes      | Yes         | Yes        | Global    | Yes     |
| max_relay_log_size                          | Yes      | Yes         | Yes        | Global    | Yes     |
| max_seeks_for_key                           | Yes      | Yes         | Yes        | Both      | Yes     |
| max_sort_length                             | Yes      | Yes         | Yes        | Both      | Yes     |
| max_sp_recursion_depth                      | Yes      | Yes         | Yes        | Both      | Yes     |
| max_user_connections                        | Yes      | Yes         | Yes        | Both      | Yes     |
| max_write_lock_count                        | Yes      | Yes         | Yes        | Global    | Yes     |
| mecab_rc_file                               | Yes      | Yes         | Yes        | Global    | No      |
| metadata_locks_max_size                     | Yes      | Yes         | Yes        | Global    | No      |
| metadata_locks_instances                    | Yes      | Yes         | Yes        | Global    | No      |
| min_examined_row_limit                      | Yes      | Yes         | Yes        | Both      | Yes     |
| myisam_data_pointer_size                    | Yes      | Yes         | Yes        | Global    | Yes     |
| myisam_max_sort_file_size                   | Yes      | Yes         | Yes        | Global    | Yes     |
| myisam mmap size                            | Yes      | Yes         | Yes        | Global    | No      |
| myisam_recover_options                      | Yes      | Yes         | Yes        | Global    | No      |
| myisam_repair_threads                       | Yes      | Yes         | Yes        | Both      | Yes     |
| myisam_sort_buffer_size                     | Yes      | Yes         | Yes        | Both      | Yes     |
| myisam_stats_method                         | Yes      | Yes         | Yes        | Both      | Yes     |
| myisam_use_mmap                             | Yes      | Yes         | Yes        | Global    | Yes     |
| mysql_firewall_mode                         | Yes      | Yes         | Yes        | Global    | Yes     |
| mysql_firewall_traces                       | Yes      | Yes         | Yes        | Global    | Yes     |
| mysql_native_password_proxy_users           | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_bind_address                         | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_compress_algorithms                  | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_connect_timeout                      | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_deflate_default_compression_level    | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_deflate_max_client_compression_level | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_document_unique_prefix               | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_enable_hex_notice                    | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_idle_workers_thread_timeout          | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_interactive_timeout                  | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                     | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|------------------------------------------|----------|-------------|------------|-----------|---------|
| mysqlx_lz4_default_compression_level     | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_lz4_max_client_compression_level  | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_max_allowed_packet                | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_max_connections                   | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_min_workers                       | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_port                              | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_port_open_timeout                 | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_read_time_out                     | Yes      | Yes         | Yes        | Session   | Yes     |
| mysqlx_socket                            | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_ca                            | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_capath                        | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_cert                          | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_cipher                        | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_crl                           | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_crlpath                       | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_ssl_key                           | Yes      | Yes         | Yes        | Global    | No      |
| mysqlx_wait_timeout                      | Yes      | Yes         | Yes        | Session   | Yes     |
| mysqlx_write_timeout                     | Yes      | Yes         | Yes        | Session   | Yes     |
| mysqlx_zstd_default_compression_level    | Yes      | Yes         | Yes        | Global    | Yes     |
| mysqlx_zstd_max_client_compression_level | Yes      | Yes         | Yes        | Global    | Yes     |
| named_pipe                               | Yes      | Yes         | Yes        | Global    | No      |
| named_pipe_full_session_group            | Yes      | Yes         | Yes        | Global    | No      |
| ndb_allow_copying_to_other_table         | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_applier_allow_skip_epoch             | Yes      | Yes         | Yes        | Global    | No      |
| ndb_autoincrement_prefetch_sz            | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_batch_size                           | Yes      | Yes         | Yes        | Global    | No      |
| ndb_blob_read_bytes                      | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_blob_write_bytes                     | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_cache_check_time                     | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_clear_apply_status                   | Yes      |             | Yes        | Global    | Yes     |
| ndb_cluster_connection_pool              | Yes      | Yes         | Yes        | Global    | No      |
| ndb_cluster_connection_pool_nodes        | Yes      | Yes         | Yes        | Global    | No      |
| ndb_conflict_role                        | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_data_node_neighbour                  | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_dbg_check_errors                     | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_default_column_format                | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_default_columns_format               | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_deferred_constraints                 | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_deferred_constraint_name             | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_distribution                         | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_distribution_name                    | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                    | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|-----------------------------------------|----------|-------------|------------|-----------|---------|
| ndb_eventbuffer_percent                 | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_eventbuffer_alloc                   | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_extra_logging                       | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_force_send                          | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_fully_replicated                    | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_index_stat                          | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_index_stat_                         | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_join_pushdown                       |          |             | Yes        | Both      | Yes     |
| ndb_log_apply_stress                    | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_apply_stress                    | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_bin                             | Yes      |             | Yes        | Both      | No      |
| ndb_log_binlog_in                       | Yes      |             | Yes        | Global    | Yes     |
| ndb_log_empty_hs                        | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_empty_hs                        | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_empty_update                    | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_empty_update                    | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_exclusive_reads                 | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_log_exclusive_reads                 | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_log_fail_timeout                    | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_orig                            | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_orig                            | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_transaction_compression         | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_transaction_compression         | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_transaction_dependency          | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_transaction_id                  | Yes      | Yes         | Yes        | Global    | No      |
| ndb_log_transaction_id                  |          |             | Yes        | Global    | No      |
| ndb_log_update_write                    | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_update_decimal                  | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_log_updatedonly                     | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_metadata_check                      | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_metadata_check_interval             | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_metadata_sync                       |          |             | Yes        | Global    | Yes     |
| ndb_optimization                        | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_optimized_no_selection              | Yes      | Yes         | Yes        | Global    | No      |
| ndb_read_backup                         | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_recv_thread_stabilization_threshold | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_recv_thread_ip_mask                 | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_replica_batch_size                  | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_replica_blob_size                   | Yes      | Yes         | Yes        | Global    | Yes     |
| Ndb_replica_max_replicated_epoch        |          |             | Yes        | Global    | No      |
| ndb_report_threshold                    | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                 | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|------------|-----------|---------|
| ndb_report_threshold                 | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_row_checksum                     |          |             | Yes        | Both      | Yes     |
| ndb_schema_discovery                 | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_schema_discovery_timeout         | Yes      | Yes         | Yes        | Global    | No      |
| ndb_schema_discovery_timeout         | Yes      | Yes         | Yes        | Global    | No      |
| ndb_schema_discovery_upgrade_allowed | Yes      | Yes         | Yes        | Global    | No      |
| ndb_show_foreign_key_mock_tables     | Yes      | Yes         | Yes        | Global    | Yes     |
| ndb_slave_config_file                | Yes      | Yes         | Yes        | Global    | Yes     |
| Ndb_system_name                      |          |             | Yes        | Global    | No      |
| ndb_table_no_logging                 |          |             | Yes        | Session   | Yes     |
| ndb_table_temporary                  |          |             | Yes        | Session   | Yes     |
| ndb_use_copying_alter_table          |          |             | Yes        | Both      | No      |
| ndb_use_exact_count                  |          |             | Yes        | Both      | Yes     |
| ndb_use_transactions                 | Yes      | Yes         | Yes        | Both      | Yes     |
| ndb_version                          |          |             | Yes        | Global    | No      |
| ndb_version_string                   |          |             | Yes        | Global    | No      |
| ndb_wait_connected                   | Yes      | Yes         | Yes        | Global    | No      |
| ndb_wait_setup                       | Yes      | Yes         | Yes        | Global    | No      |
| ndbinfo_database                     |          |             | Yes        | Global    | No      |
| ndbinfo_max_bytes                    | Yes      |             | Yes        | Both      | Yes     |
| ndbinfo_max_rows                     | Yes      |             | Yes        | Both      | Yes     |
| ndbinfo_offline                      |          |             | Yes        | Global    | Yes     |
| ndbinfo_show_hidden                  | Yes      |             | Yes        | Both      | Yes     |
| ndbinfo_table_prefix                 |          |             | Yes        | Global    | No      |
| ndbinfo_version                      |          |             | Yes        | Global    | No      |
| net_buffer_length                    | Yes      | Yes         | Yes        | Both      | Yes     |
| net_read_timeout                     | Yes      | Yes         | Yes        | Both      | Yes     |
| net_retry_count                      | Yes      | Yes         | Yes        | Both      | Yes     |
| net_write_timeout                    | Yes      | Yes         | Yes        | Both      | Yes     |
| new                                  | Yes      | Yes         | Yes        | Both      | Yes     |
| ngram_token_size                     | Yes      | Yes         | Yes        | Global    | No      |
| offline_mode                         | Yes      | Yes         | Yes        | Global    | Yes     |
| old                                  | Yes      | Yes         | Yes        | Global    | No      |
| old_alter_table                      | Yes      | Yes         | Yes        | Both      | Yes     |
| open_files_limit                     | Yes      | Yes         | Yes        | Global    | No      |
| optimizer_prune_level                | Yes      | Yes         | Yes        | Both      | Yes     |
| optimizer_search_depth               | Yes      | Yes         | Yes        | Both      | Yes     |
| optimizer_switch                     | Yes      | Yes         | Yes        | Both      | Yes     |
| optimizer_trace                      | Yes      | Yes         | Yes        | Both      | Yes     |
| optimizer_trace_features             | Yes      | Yes         | Yes        | Both      | Yes     |
| optimizer_trace_limit                | Yes      | Yes         | Yes        | Both      | Yes     |

| Name                                                | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|-----------------------------------------------------|----------|-------------|------------|-----------|---------|
| optimizer_trace_max_mem_size                        | Yes      | Yes         | Yes        | Both      | Yes     |
| optimizer_trace_file                                | Yes      | Yes         | Yes        | Both      | Yes     |
| original_commit_timestamp                           |          |             | Yes        | Session   | Yes     |
| original_server_version                             |          |             | Yes        | Session   | Yes     |
| parser_max_mem_size                                 | Yes      | Yes         | Yes        | Both      | Yes     |
| partial_revokes                                     | Yes      | Yes         | Yes        | Global    | Yes     |
| password_history                                    | Yes      | Yes         | Yes        | Global    | Yes     |
| password_require_current                            | Yes      | Yes         | Yes        | Global    | Yes     |
| password_reuse_timeval                              | Yes      | Yes         | Yes        | Global    | Yes     |
| performance_schema                                  | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_accounts_size                    | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_digests_size                     | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_error_size                       | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_stages_history_long       | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_stages_history_size       | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_statements_history_long   | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_statements_history_size   | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_transactions_history_long | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_transactions_history_size | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_waits_history_long        | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_events_waits_history_size        | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_hosts_size                       | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_cond_instances               | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_digest_length                | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_digest_sample_age            | Yes      | Yes         | Yes        | Global    | Yes     |
| performance_schema_max_file_classes                 | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_file_handles                 | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_file_instances               | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_index_instances              | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_memory_classes               | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_metadata_locks               | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_mutex_instances              | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_mutex_instances              | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_prepare_stmt_instances       | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_program_instances            | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_rwlock_instances             | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_rwlock_instances             | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_socket_instances             | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_socket_instances             | Yes      | Yes         | Yes        | Global    | No      |
| performance_schema_max_sql_text_length              | Yes      | Yes         | Yes        | Global    | No      |

| Name                                              | Cmd-Line | Option File            | System Var | Var Scope | Dynamic |
|---------------------------------------------------|----------|------------------------|------------|-----------|---------|
| performance_schema_max_stage_classes              | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_statement_classes          | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_statement_stack            | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_table_handles              | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_table_instances            | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_table_stat                 | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_thread_classes             | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_thread_instances           | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_session_connect_attrs_size | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_setup_actor_size           | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_max_setup_object_size          | Yes      | Yes                    | Yes        | Global    | No      |
| performance_schema_show_processlist               | Yes      | Yes                    | Yes        | Global    | Yes     |
| performance_schema_max_users_size                 | Yes      | Yes                    | Yes        | Global    | No      |
| persist_only_admin                                | Yes      | x509_subject           | Yes        | Global    | No      |
| persist_sensitive                                 | Yes      | variables_in_plaintext | Yes        | Global    | No      |
| persisted_globals                                 | Yes      | Yes                    | Yes        | Global    | No      |
| pid_file                                          | Yes      | Yes                    | Yes        | Global    | No      |
| plugin_dir                                        | Yes      | Yes                    | Yes        | Global    | No      |
| port                                              | Yes      | Yes                    | Yes        | Global    | No      |
| preload_buffer_size                               | Yes      | Yes                    | Yes        | Both      | Yes     |
| print_identified_with_as_hex                      | Yes      | Yes                    | Yes        | Both      | Yes     |
| profiling                                         |          |                        | Yes        | Both      | Yes     |
| profiling_history                                 | Yes      | Yes                    | Yes        | Both      | Yes     |
| protocol_compression_algorithms                   | Yes      | Yes                    | Yes        | Global    | Yes     |
| protocol_version                                  |          |                        | Yes        | Global    | No      |
| proxy_user                                        |          |                        | Yes        | Session   | No      |
| pseudo_replica_mode                               |          |                        | Yes        | Session   | Yes     |
| pseudo_slave_mode                                 |          |                        | Yes        | Session   | Yes     |
| pseudo_thread_id                                  |          |                        | Yes        | Session   | Yes     |
| query_alloc_block_size                            | Yes      | Yes                    | Yes        | Both      | Yes     |
| query_prealloc_size                               | Yes      | Yes                    | Yes        | Both      | Yes     |
| rand_seed1                                        |          |                        | Yes        | Session   | Yes     |
| rand_seed2                                        |          |                        | Yes        | Session   | Yes     |
| range_alloc_block_size                            | Yes      | Yes                    | Yes        | Both      | Yes     |
| range_optimizer_max_mem_size                      | Yes      | Yes                    | Yes        | Both      | Yes     |
| rbr_exec_mode                                     |          |                        | Yes        | Session   | Yes     |
| read_buffer_size                                  | Yes      | Yes                    | Yes        | Both      | Yes     |
| read_only                                         | Yes      | Yes                    | Yes        | Global    | Yes     |
| read_rnd_buffer_size                              | Yes      | Yes                    | Yes        | Both      | Yes     |
| regexp_stack_limit                                | Yes      | Yes                    | Yes        | Global    | Yes     |
| regexp_time_limit                                 | Yes      | Yes                    | Yes        | Global    | Yes     |

| Name                                                 | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|------------------------------------------------------|----------|-------------|------------|-----------|---------|
| relay_log                                            | Yes      | Yes         | Yes        | Global    | No      |
| relay_log_basename                                   |          |             | Yes        | Global    | No      |
| relay_log_index                                      | Yes      | Yes         | Yes        | Global    | No      |
| relay_log_info_file                                  | Yes      | Yes         | Yes        | Global    | No      |
| relay_log_info_repository                            | Yes      | Yes         | Yes        | Global    | Yes     |
| relay_log_purge                                      | Yes      | Yes         | Yes        | Global    | Yes     |
| relay_log_recover                                    | Yes      | Yes         | Yes        | Global    | No      |
| relay_log_space                                      | Yes      | Yes         | Yes        | Global    | No      |
| replica_allow_batch                                  | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_checkpoint_group                             | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_checkpoint_period                            | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_compress_protocol                            | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_exec_mode                                    | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_load_tmpdir                                  | Yes      | Yes         | Yes        | Global    | No      |
| replica_max_allowed_packet                           | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_net_timeout                                  | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_parallel_type                                | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_parallel_workers                             | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_pending_size_max                             | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_preserve_commit_order                        | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_skip_errors                                  | Yes      | Yes         | Yes        | Global    | No      |
| replica_sql_verify_checksum                          | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_transaction_retries                          | Yes      | Yes         | Yes        | Global    | Yes     |
| replica_type_conversions                             | Yes      | Yes         | Yes        | Global    | Yes     |
| replication_optimistic_for_static_plugins            | Yes      | Yes         | Yes        | Global    | Yes     |
| replication_send_only                                | Yes      | Yes         | Yes        | Global    | Yes     |
| report_host                                          | Yes      | Yes         | Yes        | Global    | No      |
| report_password                                      | Yes      | Yes         | Yes        | Global    | No      |
| report_port                                          | Yes      | Yes         | Yes        | Global    | No      |
| report_user                                          | Yes      | Yes         | Yes        | Global    | No      |
| require_row_format                                   |          |             | Yes        | Session   | Yes     |
| require_secure_transport                             | Yes      | Yes         | Yes        | Global    | Yes     |
| resultset_metadata                                   |          |             | Yes        | Session   | Yes     |
| rewriter_enabled                                     |          |             | Yes        | Global    | Yes     |
| rewriter_enabled_for_threads_without_privilege_check | Yes      | Yes         | Yes        | Global    | Yes     |
| rewriter_verbose                                     |          |             | Yes        | Global    | Yes     |
| rpl_read_size                                        | Yes      | Yes         | Yes        | Global    | Yes     |
| rpl_semi_sync_master_enabled                         | Yes      | Yes         | Yes        | Global    | Yes     |
| rpl_semi_sync_master_timeout                         | Yes      | Yes         | Yes        | Global    | Yes     |
| rpl_semi_sync_master_trace_level                     | Yes      | Yes         | Yes        | Global    | Yes     |
| rpl_semi_sync_master_wait_for_slave_count            | Yes      | Yes         | Yes        | Global    | Yes     |

| Name                                 | Cmd-Line | Option File                   | System Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------------------------|------------|-----------|---------|
| rpl_semi_sync_master_wait_no_slave   | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_master_wait_point      | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_relay_enabled          | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_relay_trace_level      | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_enabled          | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_trace_level      | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_timeout          | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_trace_level      | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_wait_for_replies | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_wait_no_reply    | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_semi_sync_slave_wait_point       | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_stop_replica_timeout             | Yes      | Yes                           | Yes        | Global    | Yes     |
| rpl_stop_slave_timeout               | Yes      | Yes                           | Yes        | Global    | Yes     |
| schema_definition_cache              | Yes      | Yes                           | Yes        | Global    | Yes     |
| secondary_engine_cost_threshold      |          |                               | Yes        | Session   | Yes     |
| secure_file_priv                     | Yes      | Yes                           | Yes        | Global    | No      |
| select_into_buffer_size              | Yes      | Yes                           | Yes        | Both      | Yes     |
| select_into_disk_size                | Yes      | Yes                           | Yes        | Both      | Yes     |
| select_into_disk_use_delay           | Yes      | Yes                           | Yes        | Both      | Yes     |
| server_id                            | Yes      | Yes                           | Yes        | Global    | Yes     |
| server_id_bits                       | Yes      | Yes                           | Yes        | Global    | No      |
| server_uuid                          |          |                               | Yes        | Global    | No      |
| session_track_gtids                  | Yes      | Yes                           | Yes        | Both      | Yes     |
| session_track_schema                 | Yes      | Yes                           | Yes        | Both      | Yes     |
| session_track_state_change           | Yes      | Yes                           | Yes        | Both      | Yes     |
| session_track_system_variables       | Yes      | Yes                           | Yes        | Both      | Yes     |
| session_track_transaction_info       | Yes      | Yes                           | Yes        | Both      | Yes     |
| sha256_password_auto_generate_keys   | Yes      | Yes                           | Yes        | Global    | No      |
| sha256_password_private_key_path     | Yes      | Yes                           | Yes        | Global    | No      |
| sha256_password_proxy_users          | Yes      | Yes                           | Yes        | Global    | Yes     |
| sha256_password_public_key_path      | Yes      | Yes                           | Yes        | Global    | No      |
| shared_memory                        | Yes      | Yes                           | Yes        | Global    | No      |
| shared_memory_name                   | Yes      | Yes                           | Yes        | Global    | No      |
| show_create_table                    | Yes      | skip_secondary_engine         | Yes        | Session   | Yes     |
| show_create_table                    | Yes      | verbosity                     | Yes        | Both      | Yes     |
| show_gipk_in_create                  | Yes      | table_and_information_schemas | Yes        | Both      | Yes     |
| show_old_temporary_tables            | Yes      |                               | Yes        | Both      | Yes     |
| skip_external_locks                  | Yes      |                               | Yes        | Global    | No      |
| skip_name_resolve                    | Yes      |                               | Yes        | Global    | No      |
| skip_networking                      | Yes      |                               | Yes        | Global    | No      |

| Name                               | Cmd-Line        | Option File | System Var | Var Scope | Dynamic |
|------------------------------------|-----------------|-------------|------------|-----------|---------|
| skip_replica_start                 | Yes             | Yes         | Yes        | Global    | No      |
| skip_show_database                 | Yes             | Yes         | Yes        | Global    | No      |
| skip_slave_start                   | Yes             | Yes         | Yes        | Global    | No      |
| slave_allow_batches                | Yes             | Yes         | Yes        | Global    | Yes     |
| slave_checkpoint                   | Yes up          | Yes         | Yes        | Global    | Yes     |
| slave_checkpoint_period            | Yes period      | Yes         | Yes        | Global    | Yes     |
| slave_compressed_protocol          | Yes protocol    | Yes         | Yes        | Global    | Yes     |
| slave_exec_mode                    | Yes             | Yes         | Yes        | Global    | Yes     |
| slave_load_tmpdir                  | Yes             | Yes         | Yes        | Global    | No      |
| slave_max_allowed_packet           | Yes packet      | Yes         | Yes        | Global    | Yes     |
| slave_net_timeout                  | Yes             | Yes         | Yes        | Global    | Yes     |
| slave_parallel_type                | Yes             | Yes         | Yes        | Global    | Yes     |
| slave_parallel_workers             | Yes workers     | Yes         | Yes        | Global    | Yes     |
| slave_pending_jobs_size_max        | Yes size_max    | Yes         | Yes        | Global    | Yes     |
| slave_preserve_commit_order        | Yes             | Yes         | Yes        | Global    | Yes     |
| slave_rows_search_algorithms       | Yes algorithms  | Yes         | Yes        | Global    | Yes     |
| slave_skip_errors                  | Yes             | Yes         | Yes        | Global    | No      |
| slave_sql_verify_checksum          | Yes checksum    | Yes         | Yes        | Global    | Yes     |
| slave_transaction_retries          | Yes tries       | Yes         | Yes        | Global    | Yes     |
| slave_type_conv                    | Yes conv        | Yes         | Yes        | Global    | Yes     |
| slow_launch_time                   | Yes             | Yes         | Yes        | Global    | Yes     |
| slow_query_log                     | Yes             | Yes         | Yes        | Global    | Yes     |
| slow_query_log_file                | Yes             | Yes         | Yes        | Global    | Yes     |
| socket                             | Yes             | Yes         | Yes        | Global    | No      |
| sort_buffer_size                   | Yes             | Yes         | Yes        | Both      | Yes     |
| source_verify_checksum             | Yes checksum    | Yes         | Yes        | Global    | Yes     |
| sql_auto_is_null                   |                 |             | Yes        | Both      | Yes     |
| sql_big_selects                    |                 |             | Yes        | Both      | Yes     |
| sql_buffer_result                  |                 |             | Yes        | Both      | Yes     |
| sql_generate_invisible_primary_key | Yes primary_key | Yes         | Yes        | Both      | Yes     |
| sql_log_bin                        |                 |             | Yes        | Session   | Yes     |
| sql_log_off                        |                 |             | Yes        | Both      | Yes     |
| sql_mode                           | Yes             | Yes         | Yes        | Both      | Yes     |
| sql_notes                          |                 |             | Yes        | Both      | Yes     |
| sql_quote_show_create              |                 |             | Yes        | Both      | Yes     |
| sql_replica_skip_counter           |                 |             | Yes        | Global    | Yes     |
| sql_require_primary_key            | Yes key         | Yes         | Yes        | Both      | Yes     |
| sql_safe_updates                   |                 |             | Yes        | Both      | Yes     |
| sql_select_limit                   |                 |             | Yes        | Both      | Yes     |
| sql_slave_skip_counter             |                 |             | Yes        | Global    | Yes     |
| sql_warnings                       |                 |             | Yes        | Both      | Yes     |

| Name                        | Cmd-Line | Option File        | System Var | Var Scope | Dynamic |
|-----------------------------|----------|--------------------|------------|-----------|---------|
| ssl_ca                      | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_capath                  | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_cert                    | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_cipher                  | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_crl                     | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_crlpath                 | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_fips_mode               | Yes      | Yes                | Yes        | Global    | Yes     |
| ssl_key                     | Yes      | Yes                | Yes        | Global    | Varies  |
| ssl_session_cache           | Yes      | node               | Yes        | Global    | Yes     |
| ssl_session_cache_timeout   | Yes      | timeout            | Yes        | Global    | Yes     |
| stored_program              | Yes      | she                | Yes        | Global    | Yes     |
| stored_program_mition_cache | Yes      | nition_cache       | Yes        | Global    | Yes     |
| super_read_only             | Yes      | Yes                | Yes        | Global    | Yes     |
| sync_binlog                 | Yes      | Yes                | Yes        | Global    | Yes     |
| sync_master_info            | Yes      | Yes                | Yes        | Global    | Yes     |
| sync_relay_log              | Yes      | Yes                | Yes        | Global    | Yes     |
| sync_relay_log_in           | Yes      | Yes                | Yes        | Global    | Yes     |
| sync_source_info            | Yes      | Yes                | Yes        | Global    | Yes     |
| syseventlog.facility        | Yes      | Yes                | Yes        | Global    | Yes     |
| syseventlog.include         | Yes      | pid                | Yes        | Global    | Yes     |
| syseventlog.tag             | Yes      | Yes                | Yes        | Global    | Yes     |
| system_time_zone            |          |                    | Yes        | Global    | No      |
| table_definition_c          | Yes      | Yes                | Yes        | Global    | Yes     |
| table_encryption_p          | Yes      | rivilege_check     | Yes        | Global    | Yes     |
| table_open_cach             | Yes      | Yes                | Yes        | Global    | Yes     |
| table_open_cach_i           | Yes      | nstances           | Yes        | Global    | No      |
| tablespace_defini           | Yes      | cache              | Yes        | Global    | Yes     |
| temptable_max_n             | Yes      | map                | Yes        | Global    | Yes     |
| temptable_max_n             | Yes      | es                 | Yes        | Global    | Yes     |
| temptable_use_n             | Yes      | esp                | Yes        | Global    | Yes     |
| terminology_use_            | Yes      | vious              | Yes        | Both      | Yes     |
| thread_cache_si             | Yes      | ze                 | Yes        | Global    | Yes     |
| thread_handling             | Yes      |                    | Yes        | Global    | No      |
| thread_pool_algor           | Yes      | m                  | Yes        | Global    | No      |
| thread_pool_dedi            | Yes      | cated_listeners    | Yes        | Global    | No      |
| thread_pool_high            | Yes      | riority_connectio  | Yes        | Both      | Yes     |
| thread_pool_max             | Yes      | tive_query_threads | Yes        | Global    | Yes     |
| thread_pool_max             | Yes      | Transactions_lim   | Yes        | Global    | Yes     |
| thread_pool_max             | Yes      | used_threads       | Yes        | Global    | Yes     |
| thread_pool_prio            | Yes      | up_timer           | Yes        | Global    | Yes     |
| thread_pool_query           | Yes      | threads_per_gro    | Yes        | Global    | Yes     |

| Name                                 | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|--------------------------------------|----------|-------------|------------|-----------|---------|
| thread_pool_size                     | Yes      | Yes         | Yes        | Global    | No      |
| thread_pool_stall                    | Yes      | Yes         | Yes        | Global    | Yes     |
| thread_pool_transaction_delay        | Yes      | Yes         | Yes        | Global    | Yes     |
| thread_stack                         | Yes      | Yes         | Yes        | Global    | No      |
| time_zone                            |          |             | Yes        | Both      | Yes     |
| timestamp                            |          |             | Yes        | Session   | Yes     |
| tls_ciphersuites                     | Yes      | Yes         | Yes        | Global    | Yes     |
| tls_version                          | Yes      | Yes         | Yes        | Global    | Varies  |
| tmp_table_size                       | Yes      | Yes         | Yes        | Both      | Yes     |
| tmpdir                               | Yes      | Yes         | Yes        | Global    | No      |
| transaction_alloc_size               | Yes      | Yes         | Yes        | Both      | Yes     |
| transaction_allow_batching           |          |             | Yes        | Session   | Yes     |
| transaction_isolation                | Yes      | Yes         | Yes        | Both      | Yes     |
| transaction_preallocated_size        | Yes      | Yes         | Yes        | Both      | Yes     |
| transaction_readonly                 | Yes      | Yes         | Yes        | Both      | Yes     |
| transaction_write_extraction         | Yes      | Yes         | Yes        | Both      | Yes     |
| unique_checks                        |          |             | Yes        | Both      | Yes     |
| updatable_views_with_limit           | Yes      | Yes         | Yes        | Both      | Yes     |
| use_secondary_engine                 |          |             | Yes        | Session   | Yes     |
| validate_password_check_user_names   | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_dictionary_file    | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_length             | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_mixed_case_count   | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_number_count       | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_policy             | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_special_char_count | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_check_user_names   | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_dictionary_file    | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_length             | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_mixed_case_count   | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_number_count       | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_policy             | Yes      | Yes         | Yes        | Global    | Yes     |
| validate_password_special_char_count | Yes      | Yes         | Yes        | Global    | Yes     |
| version                              |          |             | Yes        | Global    | No      |
| version_comment                      |          |             | Yes        | Global    | No      |
| version_compile_machine              |          |             | Yes        | Global    | No      |
| version_compile_os                   |          |             | Yes        | Global    | No      |
| version_compile_zlib                 |          |             | Yes        | Global    | No      |
| version_tokens_session               | Yes      | Yes         | Yes        | Both      | Yes     |
| version_tokens_session_number        | Yes      | Yes         | Yes        | Both      | No      |
| wait_timeout                         | Yes      | Yes         | Yes        | Both      | Yes     |

| Name                        | Cmd-Line | Option File | System Var | Var Scope | Dynamic |
|-----------------------------|----------|-------------|------------|-----------|---------|
| warning_count               |          |             | Yes        | Session   | No      |
| windowing_use_Yes_precision | Yes      | Yes         | Yes        | Both      | Yes     |
| xa_detach_on_prepare        | Prepare  | 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 Server Status Variable Reference

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                                   | Integer       | Global         |
| Aborted_connects                                  | Integer       | Global         |
| Acl_cache_items_count                             | Integer       | Global         |
| Audit_log_current_size                            | Integer       | Global         |
| Audit_log_event_max_drop_size                     | Integer       | Global         |
| Audit_log_events                                  | Integer       | Global         |
| Audit_log_events_filtered                         | Integer       | Global         |
| Audit_log_events_lost                             | Integer       | Global         |
| Audit_log_events_written                          | Integer       | Global         |
| Audit_log_total_size                              | Integer       | Global         |
| Audit_log_write_waits                             | Integer       | Global         |
| Authentication_ldap_sasl_supported_string_methods | String        | Global         |
| Binlog_cache_disk_use                             | Integer       | Global         |
| Binlog_cache_use                                  | Integer       | Global         |
| Binlog_stmt_cache_disk_use                        | Integer       | Global         |
| Binlog_stmt_cache_use                             | Integer       | Global         |
| Bytes_received                                    | Integer       | Both           |
| Bytes_sent                                        | Integer       | Both           |
| Caching_sha2_password_rsa_pubkey                  | String        | Global         |
| Com_admin_commands                                | Integer       | Both           |
| Com_alter_db                                      | Integer       | Both           |
| Com_alter_event                                   | Integer       | Both           |
| Com_alter_function                                | Integer       | Both           |
| Com_alter_procedure                               | Integer       | Both           |
| Com_alter_resource_group                          | Integer       | Global         |
| Com_alter_server                                  | Integer       | Both           |
| Com_alter_table                                   | Integer       | Both           |

| Variable Name                 | Variable Type | Variable Scope |
|-------------------------------|---------------|----------------|
| Com_alter_tablespace          | Integer       | Both           |
| Com_alter_user                | Integer       | Both           |
| Com_alter_user_default_role   | Integer       | Global         |
| Com_analyze                   | Integer       | Both           |
| Com_assign_to_keycache        | Integer       | Both           |
| Com_begin                     | Integer       | Both           |
| Com_binlog                    | Integer       | Both           |
| Com_call_procedure            | Integer       | Both           |
| Com_change_db                 | Integer       | Both           |
| Com_change_master             | Integer       | Both           |
| Com_change_repl_filter        | Integer       | Both           |
| Com_change_replication_source | Integer       | Both           |
| Com_check                     | Integer       | Both           |
| Com_checksum                  | Integer       | Both           |
| Com_clone                     | Integer       | Global         |
| Com_commit                    | Integer       | Both           |
| Com_create_db                 | Integer       | Both           |
| Com_create_event              | Integer       | Both           |
| Com_create_function           | Integer       | Both           |
| Com_create_index              | Integer       | Both           |
| Com_create_procedure          | Integer       | Both           |
| Com_create_resource_group     | Integer       | Global         |
| Com_create_role               | Integer       | Global         |
| Com_create_server             | Integer       | Both           |
| Com_create_table              | Integer       | Both           |
| Com_create_trigger            | Integer       | Both           |
| Com_create_udf                | Integer       | Both           |
| Com_create_user               | Integer       | Both           |
| Com_create_view               | Integer       | Both           |
| Com_dealloc_sql               | Integer       | Both           |
| Com_delete                    | Integer       | Both           |
| Com_delete_multi              | Integer       | Both           |
| Com_do                        | Integer       | Both           |
| Com_drop_db                   | Integer       | Both           |
| Com_drop_event                | Integer       | Both           |
| Com_drop_function             | Integer       | Both           |
| Com_drop_index                | Integer       | Both           |
| Com_drop_procedure            | Integer       | Both           |
| Com_drop_resource_group       | Integer       | Global         |
| Com_drop_role                 | Integer       | Global         |
| Com_drop_server               | Integer       | Both           |

| Variable Name               | Variable Type | Variable Scope |
|-----------------------------|---------------|----------------|
| Com_drop_table              | Integer       | Both           |
| Com_drop_trigger            | Integer       | Both           |
| Com_drop_user               | Integer       | Both           |
| Com_drop_view               | Integer       | Both           |
| Com_empty_query             | Integer       | Both           |
| Com_execute_sql             | Integer       | Both           |
| Com_explain_other           | Integer       | Both           |
| Com_flush                   | Integer       | Both           |
| Com_get_diagnostics         | Integer       | Both           |
| Com_grant                   | Integer       | Both           |
| Com_grant_roles             | Integer       | Global         |
| Com_group_replication_start | Integer       | Global         |
| Com_group_replication_stop  | Integer       | Global         |
| Com_ha_close                | Integer       | Both           |
| Com_ha_open                 | Integer       | Both           |
| Com_ha_read                 | Integer       | Both           |
| Com_help                    | Integer       | Both           |
| Com_insert                  | Integer       | Both           |
| Com_insert_select           | Integer       | Both           |
| Com_install_component       | Integer       | Global         |
| Com_install_plugin          | Integer       | Both           |
| Com_kill                    | Integer       | Both           |
| Com_load                    | Integer       | Both           |
| Com_lock_tables             | Integer       | Both           |
| Com_optimize                | Integer       | Both           |
| Com_preload_keys            | Integer       | Both           |
| Com_prepare_sql             | Integer       | Both           |
| Com_purge                   | Integer       | Both           |
| Com_purge_before_date       | Integer       | Both           |
| Com_release_savepoint       | Integer       | Both           |
| Com_rename_table            | Integer       | Both           |
| Com_rename_user             | Integer       | Both           |
| Com_repair                  | Integer       | Both           |
| Com_replace                 | Integer       | Both           |
| Com_replace_select          | Integer       | Both           |
| Com_replica_start           | Integer       | Both           |
| Com_replica_stop            | Integer       | Both           |
| Com_reset                   | Integer       | Both           |
| Com_resignal                | Integer       | Both           |
| Com_restart                 | Integer       | Both           |
| Com_revoke                  | Integer       | Both           |

| Variable Name             | Variable Type | Variable Scope |
|---------------------------|---------------|----------------|
| Com_revoke_all            | Integer       | Both           |
| Com_revoke_roles          | Integer       | Global         |
| Com_rollback              | Integer       | Both           |
| Com_rollback_to_savepoint | Integer       | Both           |
| Com_savepoint             | Integer       | Both           |
| Com_select                | Integer       | Both           |
| Com_set_option            | Integer       | Both           |
| Com_set_resource_group    | Integer       | Global         |
| Com_set_role              | Integer       | Global         |
| Com_show_authors          | Integer       | Both           |
| Com_show_binlog_events    | Integer       | Both           |
| Com_show_binlogs          | Integer       | Both           |
| Com_showCharsets          | Integer       | Both           |
| Com_show_collations       | Integer       | Both           |
| Com_show_contributors     | Integer       | Both           |
| Com_show_create_db        | Integer       | Both           |
| Com_show_create_event     | Integer       | Both           |
| Com_show_create_func      | Integer       | Both           |
| Com_show_create_proc      | Integer       | Both           |
| Com_show_create_table     | Integer       | Both           |
| Com_show_create_trigger   | Integer       | Both           |
| Com_show_create_user      | Integer       | Both           |
| Com_show_databases        | Integer       | Both           |
| Com_show_engine_logs      | Integer       | Both           |
| Com_show_engine_mutex     | Integer       | Both           |
| Com_show_engine_status    | Integer       | Both           |
| Com_show_errors           | Integer       | Both           |
| Com_show_events           | Integer       | Both           |
| Com_show_fields           | Integer       | Both           |
| Com_show_function_code    | Integer       | Both           |
| Com_show_function_status  | Integer       | Both           |
| Com_show_grants           | Integer       | Both           |
| Com_show_keys             | Integer       | Both           |
| Com_show_master_status    | Integer       | Both           |
| Com_show_ndb_status       | Integer       | Both           |
| Com_show_open_tables      | Integer       | Both           |
| Com_show_plugins          | Integer       | Both           |
| Com_show_privileges       | Integer       | Both           |
| Com_show_procedure_code   | Integer       | Both           |
| Com_show_procedure_status | Integer       | Both           |
| Com_show_processlist      | Integer       | Both           |

| Variable Name                    | Variable Type | Variable Scope |
|----------------------------------|---------------|----------------|
| Com_show_profile                 | Integer       | Both           |
| Com_show_profiles                | Integer       | Both           |
| Com_show_relaylog_events         | Integer       | Both           |
| Com_show_replica_status          | Integer       | Both           |
| Com_show_replicas                | Integer       | Both           |
| Com_show_slave_hosts             | Integer       | Both           |
| Com_show_slave_status            | Integer       | Both           |
| Com_show_status                  | Integer       | Both           |
| Com_show_storage_engines         | Integer       | Both           |
| Com_show_table_status            | Integer       | Both           |
| Com_show_tables                  | Integer       | Both           |
| Com_show_triggers                | Integer       | Both           |
| Com_show_variables               | Integer       | Both           |
| Com_show_warnings                | Integer       | Both           |
| Com_shutdown                     | Integer       | Both           |
| Com_signal                       | Integer       | Both           |
| Com_slave_start                  | Integer       | Both           |
| Com_slave_stop                   | Integer       | Both           |
| Com_stmt_close                   | Integer       | Both           |
| Com_stmt_execute                 | Integer       | Both           |
| Com_stmt_fetch                   | Integer       | Both           |
| Com_stmt_prepare                 | Integer       | Both           |
| Com_stmt_reprepare               | Integer       | Both           |
| Com_stmt_reset                   | Integer       | Both           |
| Com_stmt_send_long_data          | Integer       | Both           |
| Com_truncate                     | Integer       | Both           |
| Com_uninstall_component          | Integer       | Global         |
| Com_uninstall_plugin             | Integer       | Both           |
| Com_unlock_tables                | Integer       | Both           |
| Com_update                       | Integer       | Both           |
| Com_update_multi                 | Integer       | Both           |
| Com_xa_commit                    | Integer       | Both           |
| Com_xa_end                       | Integer       | Both           |
| Com_xa_prepare                   | Integer       | Both           |
| Com_xa_recover                   | Integer       | Both           |
| Com_xa_rollback                  | Integer       | Both           |
| Com_xa_start                     | Integer       | Both           |
| Compression                      | Integer       | Session        |
| Compression_algorithm            | String        | Global         |
| Compression_level                | Integer       | Global         |
| Connection_control_delay_general | Integer       | Global         |

| Variable Name                    | Variable Type  | Variable Scope |
|----------------------------------|----------------|----------------|
| Connection_errors_accept         | Integer        | Global         |
| Connection_errors_internal       | Integer        | Global         |
| Connection_errors_max_connectid  | Integer        | Global         |
| Connection_errors_peer_address   | Integer        | Global         |
| Connection_errors_select         | Integer        | Global         |
| Connection_errors_tcpwrap        | Integer        | Global         |
| Connections                      | Integer        | Global         |
| Created_tmp_disk_tables          | Integer        | Both           |
| Created_tmp_files                | Integer        | Global         |
| Created_tmp_tables               | Integer        | Both           |
| Current_tls_ca                   | File name      | Global         |
| Current_tls_capath               | Directory name | Global         |
| Current_tls_cert                 | File name      | Global         |
| Current_tls_cipher               | String         | Global         |
| Current_tls_ciphersuites         | String         | Global         |
| Current_tls_crl                  | File name      | Global         |
| Current_tls_crlpath              | Directory name | Global         |
| Current_tls_key                  | File name      | Global         |
| Current_tls_version              | String         | Global         |
| Delayed_errors                   | Integer        | Global         |
| Delayed_insert_threads           | Integer        | Global         |
| Delayed_writes                   | Integer        | Global         |
| dragnet.Status                   | String         | Global         |
| Error_log_buffered_bytes         | Integer        | Global         |
| Error_log_buffered_events        | Integer        | Global         |
| Error_log_expired_events         | Integer        | Global         |
| Error_log_latest_write           | Integer        | Global         |
| Firewall_access_denied           | Integer        | Global         |
| Firewall_access_granted          | Integer        | Global         |
| Firewall_cached_entries          | Integer        | Global         |
| Flush_commands                   | Integer        | Global         |
| Global_connection_memory         | Integer        | Global         |
| group_replication_primary_member | String         | Global         |
| Handler_commit                   | Integer        | Both           |
| Handler_delete                   | Integer        | Both           |
| Handler_discover                 | Integer        | Both           |
| Handler_external_lock            | Integer        | Both           |
| Handler_mrr_init                 | Integer        | Both           |
| Handler_prepare                  | Integer        | Both           |
| Handler_read_first               | Integer        | Both           |
| Handler_read_key                 | Integer        | Both           |

| Variable Name                       | Variable Type | Variable Scope |
|-------------------------------------|---------------|----------------|
| Handler_read_last                   | Integer       | Both           |
| Handler_read_next                   | Integer       | Both           |
| Handler_read_prev                   | Integer       | Both           |
| Handler_read_rnd                    | Integer       | Both           |
| Handler_read_rnd_next               | Integer       | Both           |
| Handler_rollback                    | Integer       | Both           |
| Handler_savepoint                   | Integer       | Both           |
| Handler_savepoint_rollback          | Integer       | Both           |
| Handler_update                      | Integer       | Both           |
| Handler_write                       | Integer       | Both           |
| Innodb_buffer_pool_bytes_data       | Integer       | Global         |
| Innodb_buffer_pool_bytes_dirty      | Integer       | Global         |
| Innodb_buffer_pool_dump_status      | String        | Global         |
| Innodb_buffer_pool_load_status      | String        | Global         |
| Innodb_buffer_pool_pages_data       | Integer       | Global         |
| Innodb_buffer_pool_pages_dirty      | Integer       | Global         |
| Innodb_buffer_pool_pages_flushed    | Integer       | Global         |
| Innodb_buffer_pool_pages_free       | Integer       | Global         |
| Innodb_buffer_pool_pages_latched    | Integer       | Global         |
| Innodb_buffer_pool_pages_misc       | Integer       | Global         |
| Innodb_buffer_pool_pages_total      | Integer       | Global         |
| Innodb_buffer_pool_read_ahead       | Integer       | Global         |
| Innodb_buffer_pool_read_ahead_dirty | Integer       | Global         |
| Innodb_buffer_pool_read_ahead_dirty | Integer       | Global         |
| Innodb_buffer_pool_read_requests    | Integer       | Global         |
| Innodb_buffer_pool_reads            | Integer       | Global         |
| Innodb_buffer_pool_resize_status    | String        | Global         |
| Innodb_buffer_pool_resize_status    | Integer       | Global         |
| Innodb_buffer_pool_resize_status    | Integer       | Global         |
| Innodb_buffer_pool_wait_free        | Integer       | Global         |
| Innodb_buffer_pool_write_requests   | Integer       | Global         |
| Innodb_data_fsyncs                  | Integer       | Global         |
| Innodb_data_pending_fsyncs          | Integer       | Global         |
| Innodb_data_pending_reads           | Integer       | Global         |
| Innodb_data_pending_writes          | Integer       | Global         |
| Innodb_data_read                    | Integer       | Global         |
| Innodb_data_reads                   | Integer       | Global         |
| Innodb_data_writes                  | Integer       | Global         |
| Innodb_data_written                 | Integer       | Global         |
| Innodb_dblwr_pages_written          | Integer       | Global         |
| Innodb_dblwr_writes                 | Integer       | Global         |

| Variable Name                    | Variable Type | Variable Scope |
|----------------------------------|---------------|----------------|
| Innodb_have_atomic_builtin       | Integer       | Global         |
| Innodb_log_waits                 | Integer       | Global         |
| Innodb_log_write_requests        | Integer       | Global         |
| Innodb_log_writes                | Integer       | Global         |
| Innodb_num_open_files            | Integer       | Global         |
| Innodb_os_log_fsyncs             | Integer       | Global         |
| Innodb_os_log_pending_fsyncs     | Integer       | Global         |
| Innodb_os_log_pending_writes     | Integer       | Global         |
| Innodb_os_log_written            | Integer       | Global         |
| Innodb_page_size                 | Integer       | Global         |
| Innodb_pages_created             | Integer       | Global         |
| Innodb_pages_read                | Integer       | Global         |
| Innodb_pages_written             | Integer       | Global         |
| Innodb_redo_log_capacity_resized | Integer       | Global         |
| Innodb_redo_log_checkpoint_lsn   | Integer       | Global         |
| Innodb_redo_log_current_lsn      | Integer       | Global         |
| Innodb_redo_log_enabled          | Boolean       | Global         |
| Innodb_redo_log_flushed_to_disk  | Integer       | Global         |
| Innodb_redo_log_logical_size     | Integer       | Global         |
| Innodb_redo_log_physical_size    | Boolean       | Global         |
| Innodb_redo_log_read_only        | Boolean       | Global         |
| Innodb_redo_log_resize_status    | String        | Global         |
| Innodb_redo_log_uuid             | Integer       | Global         |
| Innodb_row_lock_current_waits    | Integer       | Global         |
| Innodb_row_lock_time             | Integer       | Global         |
| Innodb_row_lock_time_avg         | Integer       | Global         |
| Innodb_row_lock_time_max         | Integer       | Global         |
| Innodb_row_lock_waits            | Integer       | Global         |
| Innodb_rows_deleted              | Integer       | Global         |
| Innodb_rows_inserted             | Integer       | Global         |
| Innodb_rows_read                 | Integer       | Global         |
| Innodb_rows_updated              | Integer       | Global         |
| Innodb_system_rows_deleted       | Integer       | Global         |
| Innodb_system_rows_inserted      | Integer       | Global         |
| Innodb_system_rows_read          | Integer       | Global         |
| Innodb_truncated_status_writes   | Integer       | Global         |
| Innodb_undo_tablespaces_active   | Integer       | Global         |
| Innodb_undo_tablespaces_explicit | Integer       | Global         |
| Innodb_undo_tablespaces_implicit | Integer       | Global         |
| Innodb_undo_tablespaces_total    | Integer       | Global         |
| Key_blocks_not_flushed           | Integer       | Global         |

| Variable Name                      | Variable Type | Variable Scope |
|------------------------------------|---------------|----------------|
| Key_blocks_unused                  | Integer       | Global         |
| Key_blocks_used                    | Integer       | Global         |
| Key_read_requests                  | Integer       | Global         |
| Key_reads                          | Integer       | Global         |
| Key_write_requests                 | Integer       | Global         |
| Key_writes                         | Integer       | Global         |
| Last_query_cost                    | Numeric       | Session        |
| Last_query_partial_plans           | Integer       | Session        |
| Locked_connects                    | Integer       | Global         |
| Max_execution_time_exceeded        | Integer       | Both           |
| Max_execution_time_set             | Integer       | Both           |
| Max_execution_time_set_failed      | Integer       | Both           |
| Max_used_connections               | Integer       | Global         |
| Max_used_connections_time          | Datetime      | Global         |
| mecab_charset                      | String        | Global         |
| Mysqlx_aborted_clients             | Integer       | Global         |
| Mysqlx_address                     | String        | Global         |
| Mysqlx_bytes_received              | Integer       | Both           |
| Mysqlx_bytes_received_compressed   | Integer       | Both           |
| Mysqlx_bytes_received_uncompressed | Integer       | Both           |
| Mysqlx_bytes_sent                  | Integer       | Both           |
| Mysqlx_bytes_sent_compressed       | Integer       | Both           |
| Mysqlx_bytes_sent_uncompressed     | Integer       | Both           |
| Mysqlx_compression_algorithm       | String        | Session        |
| Mysqlx_compression_level           | String        | Session        |
| Mysqlx_connection_accept_errors    | Integer       | Both           |
| Mysqlx_connection_errors           | Integer       | Both           |
| Mysqlx_connections_accepted        | Integer       | Global         |
| Mysqlx_connections_closed          | Integer       | Global         |
| Mysqlx_connections_rejected        | Integer       | Global         |
| Mysqlx_crud_create_view            | Integer       | Both           |
| Mysqlx_crud_delete                 | Integer       | Both           |
| Mysqlx_crud_drop_view              | Integer       | Both           |
| Mysqlx_crud_find                   | Integer       | Both           |
| Mysqlx_crud_insert                 | Integer       | Both           |
| Mysqlx_crud_modify_view            | Integer       | Both           |
| Mysqlx_crud_update                 | Integer       | Both           |
| Mysqlx_cursor_close                | Integer       | Both           |
| Mysqlx_cursor_fetch                | Integer       | Both           |
| Mysqlx_cursor_open                 | Integer       | Both           |
| Mysqlx_errors_sent                 | Integer       | Both           |

| Variable Name                        | Variable Type | Variable Scope |
|--------------------------------------|---------------|----------------|
| Mysqlx_errors_unknown_message        | Integer       | Both           |
| Mysqlx_expect_close                  | Integer       | Both           |
| Mysqlx_expect_open                   | Integer       | Both           |
| Mysqlx_init_error                    | Integer       | Both           |
| Mysqlx_messages_sent                 | Integer       | Both           |
| Mysqlx_notice_global_sent            | Integer       | Both           |
| Mysqlx_notice_other_sent             | Integer       | Both           |
| Mysqlx_notice_warning_sent           | Integer       | Both           |
| Mysqlx_notified_by_group_replication | Integer       | Both           |
| Mysqlx_port                          | String        | Global         |
| Mysqlx_prep_deallocate               | Integer       | Both           |
| Mysqlx_prep_execute                  | Integer       | Both           |
| Mysqlx_prep_prepare                  | Integer       | Both           |
| Mysqlx_rows_sent                     | Integer       | Both           |
| Mysqlx_sessions                      | Integer       | Global         |
| Mysqlx_sessions_accepted             | Integer       | Global         |
| Mysqlx_sessions_closed               | Integer       | Global         |
| Mysqlx_sessions_fatal_error          | Integer       | Global         |
| Mysqlx_sessions_killed               | Integer       | Global         |
| Mysqlx_sessions_rejected             | Integer       | Global         |
| Mysqlx_socket                        | String        | Global         |
| Mysqlx_ssl_accept_renegotiates       | Integer       | Global         |
| Mysqlx_ssl_accepts                   | Integer       | Global         |
| Mysqlx_ssl_active                    | Integer       | Both           |
| Mysqlx_ssl_cipher                    | Integer       | Both           |
| Mysqlx_ssl_cipher_list               | Integer       | Both           |
| Mysqlx_ssl_ctx_verify_depth          | Integer       | Both           |
| Mysqlx_ssl_ctx_verify_mode           | Integer       | Both           |
| Mysqlx_ssl_finished_accepts          | Integer       | Global         |
| Mysqlx_ssl_server_not_after          | Integer       | Global         |
| Mysqlx_ssl_server_not_before         | Integer       | Global         |
| Mysqlx_ssl_verify_depth              | Integer       | Global         |
| Mysqlx_ssl_verify_mode               | Integer       | Global         |
| Mysqlx_ssl_version                   | Integer       | Both           |
| Mysqlx_stmt_create_collection        | Integer       | Both           |
| Mysqlx_stmt_create_collection_index  | Integer       | Both           |
| Mysqlx_stmt_disable_notices          | Integer       | Both           |
| Mysqlx_stmt_drop_collection          | Integer       | Both           |
| Mysqlx_stmt_drop_collection_index    | Integer       | Both           |
| Mysqlx_stmt_enable_notices           | Integer       | Both           |
| Mysqlx_stmt_ensure_collection        | String        | Both           |

| Variable Name                                   | Variable Type | Variable Scope |
|-------------------------------------------------|---------------|----------------|
| Mysqli_stmt_execute_mysqli                      | Integer       | Both           |
| Mysqli_stmt_execute_sql                         | Integer       | Both           |
| Mysqli_stmt_execute_xplugin                     | Integer       | Both           |
| Mysqli_stmt_get_collection_options              | Integer       | Both           |
| Mysqli_stmt_kill_client                         | Integer       | Both           |
| Mysqli_stmt_list_clients                        | Integer       | Both           |
| Mysqli_stmt_list_notices                        | Integer       | Both           |
| Mysqli_stmt_list_objects                        | Integer       | Both           |
| Mysqli_stmt_modify_collection_options           | Integer       | Both           |
| Mysqli_stmt_ping                                | Integer       | Both           |
| Mysqli_worker_threads                           | Integer       | Global         |
| Mysqli_worker_threads_active                    | Integer       | Global         |
| Ndb_api_adaptive_send_deferred                  | Integer       | Global         |
| Ndb_api_adaptive_send_deferred_replica          | Integer       | Global         |
| Ndb_api_adaptive_send_deferred_session          | Integer       | Global         |
| Ndb_api_adaptive_send_deferred_slave            | Integer       | Global         |
| Ndb_api_adaptive_send_forced_connection         | Integer       | Global         |
| Ndb_api_adaptive_send_forced_connection_replica | Integer       | Global         |
| Ndb_api_adaptive_send_forced_connection_session | Integer       | Global         |
| Ndb_api_adaptive_send_forced_connection_slave   | Integer       | Global         |
| Ndb_api_adaptive_send_unforced                  | Integer       | Global         |
| Ndb_api_adaptive_send_unforced_replica          | Integer       | Global         |
| Ndb_api_adaptive_send_unforced_session          | Integer       | Global         |
| Ndb_api_adaptive_send_unforced_slave            | Integer       | Global         |
| Ndb_api_bytes_received_count                    | Integer       | Global         |
| Ndb_api_bytes_received_count_replica            | Integer       | Global         |
| Ndb_api_bytes_received_count_session            | Integer       | Session        |
| Ndb_api_bytes_received_count_slave              | Integer       | Global         |
| Ndb_api_bytes_sent_count                        | Integer       | Global         |
| Ndb_api_bytes_sent_count_replica                | Integer       | Global         |
| Ndb_api_bytes_sent_count_session                | Integer       | Session        |
| Ndb_api_bytes_sent_count_slave                  | Integer       | Global         |
| Ndb_api_event_bytes_count                       | Integer       | Global         |
| Ndb_api_event_bytes_count_inject                | Integer       | Global         |
| Ndb_api_event_data_count                        | Integer       | Global         |
| Ndb_api_event_data_count_inject                 | Integer       | Global         |
| Ndb_api_event_nodata_count                      | Integer       | Global         |
| Ndb_api_event_nodata_count_inject               | Integer       | Global         |
| Ndb_api_pk_op_count                             | Integer       | Global         |
| Ndb_api_pk_op_count_replica                     | Integer       | Global         |
| Ndb_api_pk_op_count_session                     | Integer       | Session        |

| Variable Name                              | Variable Type | Variable Scope |
|--------------------------------------------|---------------|----------------|
| Ndb_api_pk_op_count_slave                  | Integer       | Global         |
| Ndb_api_pruned_scan_count                  | Integer       | Global         |
| Ndb_api_pruned_scan_count_replica          | Integer       | Global         |
| Ndb_api_pruned_scan_count_session          | Integer       | Session        |
| Ndb_api_pruned_scan_count_slave            | Integer       | Global         |
| Ndb_api_range_scan_count                   | Integer       | Global         |
| Ndb_api_range_scan_count_replica           | Integer       | Global         |
| Ndb_api_range_scan_count_session           | Integer       | Session        |
| Ndb_api_range_scan_count_slave             | Integer       | Global         |
| Ndb_api_read_row_count                     | Integer       | Global         |
| Ndb_api_read_row_count_replica             | Integer       | Global         |
| Ndb_api_read_row_count_session             | Integer       | Session        |
| Ndb_api_read_row_count_slave               | Integer       | Global         |
| Ndb_api_scan_batch_count                   | Integer       | Global         |
| Ndb_api_scan_batch_count_replica           | Integer       | Global         |
| Ndb_api_scan_batch_count_session           | Integer       | Session        |
| Ndb_api_scan_batch_count_slave             | Integer       | Global         |
| Ndb_api_table_scan_count                   | Integer       | Global         |
| Ndb_api_table_scan_count_replica           | Integer       | Global         |
| Ndb_api_table_scan_count_session           | Integer       | Session        |
| Ndb_api_table_scan_count_slave             | Integer       | Global         |
| Ndb_api_trans_abort_count                  | Integer       | Global         |
| Ndb_api_trans_abort_count_replica          | Integer       | Global         |
| Ndb_api_trans_abort_count_session          | Integer       | Session        |
| Ndb_api_trans_abort_count_slave            | Integer       | Global         |
| Ndb_api_trans_close_count                  | Integer       | Global         |
| Ndb_api_trans_close_count_replica          | Integer       | Global         |
| Ndb_api_trans_close_count_session          | Integer       | Session        |
| Ndb_api_trans_close_count_slave            | Integer       | Global         |
| Ndb_api_trans_commit_count                 | Integer       | Global         |
| Ndb_api_trans_commit_count_replica         | Integer       | Global         |
| Ndb_api_trans_commit_count_session         | Integer       | Session        |
| Ndb_api_trans_commit_count_slave           | Integer       | Global         |
| Ndb_api_trans_local_read_row_count         | Integer       | Global         |
| Ndb_api_trans_local_read_row_count_replica | Integer       | Global         |
| Ndb_api_trans_local_read_row_count_session | Integer       | Session        |
| Ndb_api_trans_local_read_row_count_slave   | Integer       | Global         |
| Ndb_api_trans_start_count                  | Integer       | Global         |
| Ndb_api_trans_start_count_replica          | Integer       | Global         |
| Ndb_api_trans_start_count_session          | Integer       | Session        |
| Ndb_api_trans_start_count_slave            | Integer       | Global         |

| Variable Name                            | Variable Type | Variable Scope |
|------------------------------------------|---------------|----------------|
| Ndb_api_uk_op_count                      | Integer       | Global         |
| Ndb_api_uk_op_count_replica              | Integer       | Global         |
| Ndb_api_uk_op_count_session              | Integer       | Session        |
| Ndb_api_uk_op_count_slave                | Integer       | Global         |
| Ndb_api_wait_exec_complete_count         | Integer       | Global         |
| Ndb_api_wait_exec_complete_count_replica | Integer       | Global         |
| Ndb_api_wait_exec_complete_count_session | Integer       | Session        |
| Ndb_api_wait_exec_complete_count_slave   | Integer       | Global         |
| Ndb_api_wait_meta_request_count          | Integer       | Global         |
| Ndb_api_wait_meta_request_count_replica  | Integer       | Global         |
| Ndb_api_wait_meta_request_count_session  | Integer       | Session        |
| Ndb_api_wait_meta_request_count_slave    | Integer       | Global         |
| Ndb_api_wait_nanos_count                 | Integer       | Global         |
| Ndb_api_wait_nanos_count_replica         | Integer       | Global         |
| Ndb_api_wait_nanos_count_session         | Integer       | Session        |
| Ndb_api_wait_nanos_count_slave           | Integer       | Global         |
| Ndb_api_wait_scan_result_count           | Integer       | Global         |
| Ndb_api_wait_scan_result_count_replica   | Integer       | Global         |
| Ndb_api_wait_scan_result_count_session   | Integer       | Session        |
| Ndb_api_wait_scan_result_count_slave     | Integer       | Global         |
| Ndb_cluster_node_id                      | Integer       | Global         |
| Ndb_config_from_host                     | Integer       | Both           |
| Ndb_config_from_port                     | Integer       | Both           |
| Ndb_config_generation                    | Integer       | Global         |
| Ndb_conflict_fn_epoch                    | Integer       | Global         |
| Ndb_conflict_fn_epoch_trans              | Integer       | Global         |
| Ndb_conflict_fn_epoch2                   | Integer       | Global         |
| Ndb_conflict_fn_epoch2_trans             | Integer       | Global         |
| Ndb_conflict_fn_max                      | Integer       | Global         |
| Ndb_conflict_fn_max_del_win              | Integer       | Global         |
| Ndb_conflict_fn_max_del_win_ins          | Integer       | Global         |
| Ndb_conflict_fn_max_ins                  | Integer       | Global         |
| Ndb_conflict_fn_old                      | Integer       | Global         |
| Ndb_conflict_last_conflict_epoch         | Integer       | Global         |
| Ndb_conflict_last_stable_epoch           | Integer       | Global         |
| Ndb_conflict_reflected_op_discard        | Integer       | Global         |
| Ndb_conflict_reflected_op_prepare        | Integer       | Global         |
| Ndb_conflict_refresh_op_count            | Integer       | Global         |
| Ndb_conflict_trans_conflict_commit       | Integer       | Global         |
| Ndb_conflict_trans_detect_iter_count     | Integer       | Global         |
| Ndb_conflict_trans_reject_count          | Integer       | Global         |

| Variable Name                                      | Variable Type | Variable Scope |
|----------------------------------------------------|---------------|----------------|
| Ndb_conflict_trans_row_conflict_count              | Integer       | Global         |
| Ndb_conflict_trans_row_reject_count                | Integer       | Global         |
| Ndb_epoch_delete_delete_count                      | Integer       | Global         |
| Ndb_execute_count                                  | Integer       | Global         |
| Ndb_last_commit_epoch_server                       | Integer       | Global         |
| Ndb_last_commit_epoch_session                      | Integer       | Session        |
| Ndb_metadata_blacklist_size                        | Integer       | Global         |
| Ndb_metadata_detected_count                        | Integer       | Global         |
| Ndb_metadata_excluded_count                        | Integer       | Global         |
| Ndb_metadata_synced_count                          | Integer       | Global         |
| Ndb_cluster_node_id                                | Integer       | Global         |
| Ndb_number_of_data_nodes                           | Integer       | Global         |
| Ndb_pruned_scan_count                              | Integer       | Global         |
| Ndb_pushed_queries_defined                         | Integer       | Global         |
| Ndb_pushed_queries_dropped                         | Integer       | Global         |
| Ndb_pushed_queries_executed                        | Integer       | Global         |
| Ndb_pushed_reads                                   | Integer       | Global         |
| Ndb_scan_count                                     | Integer       | Global         |
| Ndb_slave_max_replicated_epoch                     | Integer       | Global         |
| Ndb_trans_hint_count_session                       | Integer       | Both           |
| Not_flushed_delayed_rows                           | Integer       | Global         |
| Ongoing_anonymous_gtid_violating_transaction_count | Integer       | Global         |
| Ongoing_anonymous_transaction                      | Integer       | Global         |
| Ongoing_automatic_gtid_violating_transaction_count | Integer       | Global         |
| Open_files                                         | Integer       | Global         |
| Open_streams                                       | Integer       | Global         |
| Open_table_definitions                             | Integer       | Global         |
| Open_tables                                        | Integer       | Both           |
| Opened_files                                       | Integer       | Global         |
| Opened_table_definitions                           | Integer       | Both           |
| Opened_tables                                      | Integer       | Both           |
| Performance_schema_accounts_lost                   | Integer       | Global         |
| Performance_schema_cond_classes_lost               | Integer       | Global         |
| Performance_schema_cond_instances_lost             | Integer       | Global         |
| Performance_schema_digest_lost                     | Integer       | Global         |
| Performance_schema_file_classes_lost               | Integer       | Global         |
| Performance_schema_file_handles_lost               | Integer       | Global         |
| Performance_schema_file_instances_lost             | Integer       | Global         |
| Performance_schema_hosts_lost                      | Integer       | Global         |
| Performance_schema_index_stat_lost                 | Integer       | Global         |
| Performance_schema_locker_lost                     | Integer       | Global         |

| Variable Name                                       | Variable Type | Variable Scope |
|-----------------------------------------------------|---------------|----------------|
| Performance_schema_memory_clashes_lost              | Integer       | Global         |
| Performance_schema_metadata_latches_lost            | Integer       | Global         |
| Performance_schema_mutex_classes_lost               | Integer       | Global         |
| Performance_schema_mutex_instances_lost             | Integer       | Global         |
| Performance_schema_nested_statements_lost           | Integer       | Global         |
| Performance_schema_prepared_statements_lost         | Integer       | Global         |
| Performance_schema_program_latches_lost             | Integer       | Global         |
| Performance_schema_rwlock_classes_lost              | Integer       | Global         |
| Performance_schema_rwlock_instances_lost            | Integer       | Global         |
| Performance_schema_session_completions_longest_seen | Integer       | Global         |
| Performance_schema_session_completions_lost         | Integer       | Global         |
| Performance_schema_socket_classes_lost              | Integer       | Global         |
| Performance_schema_socket_instances_lost            | Integer       | Global         |
| Performance_schema_stage_classes_lost               | Integer       | Global         |
| Performance_schema_statement_handles_lost           | Integer       | Global         |
| Performance_schema_table_handles_lost               | Integer       | Global         |
| Performance_schema_table_instances_lost             | Integer       | Global         |
| Performance_schema_table_locks_lost                 | Integer       | Global         |
| Performance_schema_thread_classes_lost              | Integer       | Global         |
| Performance_schema_thread_instances_lost            | Integer       | Global         |
| Performance_schema_users_lost                       | Integer       | Global         |
| Prepared_stmt_count                                 | Integer       | Global         |
| Queries                                             | Integer       | Both           |
| Questions                                           | Integer       | Both           |
| Replica_open_temp_tables                            | Integer       | Global         |
| Replica_rows_last_search_algorithm                  | String        | Global         |
| Resource_group_supported                            | Boolean       | Global         |
| Rewriter_number_loaded_rules                        | Integer       | Global         |
| Rewriter_number_reloads                             | Integer       | Global         |
| Rewriter_number_rewritten_queries                   | Integer       | Global         |
| Rewriter_reload_error                               | Boolean       | Global         |
| Rpl_semi_sync_master_clients                        | Integer       | Global         |
| Rpl_semi_sync_master_net_avg_time                   | Integer       | Global         |
| Rpl_semi_sync_master_net_wait_time                  | Integer       | Global         |
| Rpl_semi_sync_master_net_waits                      | Integer       | Global         |
| Rpl_semi_sync_master_no_times                       | Integer       | Global         |
| Rpl_semi_sync_master_no_tx                          | Integer       | Global         |
| Rpl_semi_sync_master_status                         | Boolean       | Global         |
| Rpl_semi_sync_master_timefunc_fatigues              | Integer       | Global         |
| Rpl_semi_sync_master_tx_avg_wait_time               | Integer       | Global         |
| Rpl_semi_sync_master_tx_wait_time                   | Integer       | Global         |

| Variable Name                        | Variable Type | Variable Scope |
|--------------------------------------|---------------|----------------|
| Rpl_semi_sync_master_tx_waits        | Integer       | Global         |
| Rpl_semi_sync_master_wait_pos_interv | Integer       | Global         |
| Rpl_semi_sync_master_wait_sessint    | Integer       | Global         |
| Rpl_semi_sync_master_yes_tx          | Integer       | Global         |
| Rpl_semi_sync_replica_status         | Boolean       | Global         |
| Rpl_semi_sync_slave_status           | Boolean       | Global         |
| Rpl_semi_sync_source_clients         | Integer       | Global         |
| Rpl_semi_sync_source_net_avg_int     | Integer       | Global         |
| Rpl_semi_sync_source_net_wait_int    | Integer       | Global         |
| Rpl_semi_sync_source_net_waits       | Integer       | Global         |
| Rpl_semi_sync_source_no_times        | Integer       | Global         |
| Rpl_semi_sync_source_no_tx           | Integer       | Global         |
| Rpl_semi_sync_source_status          | Boolean       | Global         |
| Rpl_semi_sync_source_timefunc_fatig  | Integer       | Global         |
| Rpl_semi_sync_source_tx_avg_wint     | Integer       | Global         |
| Rpl_semi_sync_source_tx_wait_tint    | Integer       | Global         |
| Rpl_semi_sync_source_tx_waits        | Integer       | Global         |
| Rpl_semi_sync_source_wait_pos_interv | Integer       | Global         |
| Rpl_semi_sync_source_wait_sessint    | Integer       | Global         |
| Rpl_semi_sync_source_yes_tx          | Integer       | Global         |
| Rsa_public_key                       | String        | Global         |
| Secondary_engine_execution_count     | Integer       | Both           |
| Select_full_join                     | Integer       | Both           |
| Select_full_range_join               | Integer       | Both           |
| Select_range                         | Integer       | Both           |
| Select_range_check                   | Integer       | Both           |
| Select_scan                          | Integer       | Both           |
| Slave_open_temp_tables               | Integer       | Global         |
| Slave_rows_last_search_algorithm     | String        | Global         |
| Slow_launch_threads                  | Integer       | Both           |
| Slow_queries                         | Integer       | Both           |
| Sort_merge_passes                    | Integer       | Both           |
| Sort_range                           | Integer       | Both           |
| Sort_rows                            | Integer       | Both           |
| Sort_scan                            | Integer       | Both           |
| Ssl_accept_renegotiates              | Integer       | Global         |
| Ssl_accepts                          | Integer       | Global         |
| Ssl_callback_cache_hits              | Integer       | Global         |
| Ssl_cipher                           | String        | Both           |
| Ssl_cipher_list                      | String        | Both           |
| Ssl_client_connects                  | Integer       | Global         |

| Variable Name                     | Variable Type | Variable Scope |
|-----------------------------------|---------------|----------------|
| Ssl_connect_renegotiates          | Integer       | Global         |
| Ssl_ctx_verify_depth              | Integer       | Global         |
| Ssl_ctx_verify_mode               | Integer       | Global         |
| Ssl_default_timeout               | Integer       | Both           |
| Ssl_finished_accepts              | Integer       | Global         |
| Ssl_finished_connects             | Integer       | Global         |
| Ssl_server_not_after              | Integer       | Both           |
| Ssl_server_not_before             | Integer       | Both           |
| Ssl_session_cache_hits            | Integer       | Global         |
| Ssl_session_cache_misses          | Integer       | Global         |
| Ssl_session_cache_mode            | String        | Global         |
| Ssl_session_cache_overflows       | Integer       | Global         |
| Ssl_session_cache_size            | Integer       | Global         |
| Ssl_session_cache_timeout         | Integer       | Global         |
| Ssl_session_cache_timeouts        | Integer       | Global         |
| Ssl_sessions_reused               | Integer       | Session        |
| Ssl_used_session_cache_entries    | Integer       | Global         |
| Ssl_verify_depth                  | Integer       | Both           |
| Ssl_verify_mode                   | Integer       | Both           |
| Ssl_version                       | String        | Both           |
| Table_locks_immediate             | Integer       | Global         |
| Table_locks_waited                | Integer       | Global         |
| Table_open_cache_hits             | Integer       | Both           |
| Table_open_cache_misses           | Integer       | Both           |
| Table_open_cache_overflows        | Integer       | Both           |
| Tc_log_max_pages_used             | Integer       | Global         |
| Tc_log_page_size                  | Integer       | Global         |
| Tc_log_page_waits                 | Integer       | Global         |
| Telemetry_traces_supported        | Boolean       | Global         |
| Threads_cached                    | Integer       | Global         |
| Threads_connected                 | Integer       | Global         |
| Threads_created                   | Integer       | Global         |
| Threads_running                   | Integer       | Global         |
| Tls_library_version               | String        | Global         |
| Uptime                            | Integer       | Global         |
| Uptime_since_flush_status         | Integer       | Global         |
| validate_password_dictionary_file | Datetime      | Global         |
| validate_password_dictionary_file | Integer       | Global         |
| validate_password.dictionary_file | Datetime      | Global         |
| validate_password.dictionary_file | Integer       | Global         |

## 5.1.7 Server Command Options

When you start the `mysqld` server, you can specify program options using any of the methods described in [Section 4.2.2, “Specifying 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”](#). That section also describes option file format and syntax.

`mysqld` reads options from the `[mysqld]` and `[server]` groups. `mysqld_safe` reads options from the `[mysqld]`, `[server]`, `[mysqld_safe]`, and `[safe_mysqld]` groups. `mysql.server` reads options from the `[mysqld]` and `[mysql.server]` groups.

`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` statement. Some items displayed by the preceding `mysqld` command do not appear in `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”](#).
- SSL-related options: See [Command Options for Encrypted Connections](#).
- Binary log control options: See [Section 5.4.4, “The Binary Log”](#).
- Replication-related options: See [Section 17.1.6, “Replication and Binary Logging Options and Variables”](#).
- Options for loading plugins such as pluggable storage engines: See [Section 5.6.1, “Installing and Uninstalling Plugins”](#).
- Options specific to particular storage engines: See [Section 15.14, “InnoDB Startup Options and System Variables”](#) and [Section 16.2.1, “MyISAM Startup Options”](#).

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` sets the `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` 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` statement. See [Section 13.7.6.1, “SET Syntax for Variable Assignment”](#).

[Section 5.1.8, “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”](#).

- `--help`, `-?`

|                     |                     |
|---------------------|---------------------|
| Command-Line Format | <code>--help</code> |
|---------------------|---------------------|

Display a short help message and exit. Use both the `--verbose` and `--help` options to see the full message.

- `--admin-ssl`, `--skip-admin-ssl`

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

The `--admin-ssl` option is like the `--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”](#).

The `--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` can be specified in negated form as `--skip-admin-ssl` or a synonym (`--admin-ssl=OFF`, `--disable-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` 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` at runtime. For example, you can use `--admin-ssl=OFF` 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”](#). 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` and `admin_ssl_key` system variables on the server side and the `--ssl-ca` (or `--ssl-capath`) option on the client side. For additional information specifically about the administrative interface, see [Administrative Interface Support for Encrypted Connections](#).

Because support for encrypted connections is enabled by default, it is normally unnecessary to specify `--admin-ssl`. As of MySQL 8.0.26, `--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` in negated form. Set the `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`

|                     |                                                 |
|---------------------|-------------------------------------------------|
| Command-Line Format | <code>--allow-suspicious-udfs[={OFF ON}]</code> |
| 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](#).

- `--ansi`

|                     |                     |
|---------------------|---------------------|
| Command-Line Format | <code>--ansi</code> |
|---------------------|---------------------|

Use standard (ANSI) SQL syntax instead of MySQL syntax. For more precise control over the server SQL mode, use the `--sql-mode` option instead. See [Section 1.6, “MySQL Standards Compliance”](#), and [Section 5.1.11, “Server SQL Modes”](#).

- `--basedir=dir_name, -b dir_name`

|                                   |                                                      |
|-----------------------------------|------------------------------------------------------|
| Command-Line Format               | <code>--basedir=dir_name</code>                      |
| System Variable                   | <code>basedir</code>                                 |
| Scope                             | Global                                               |
| Dynamic                           | No                                                   |
| <code>SET_VAR</code> Hint Applies | No                                                   |
| Type                              | Directory name                                       |
| Default Value                     | <code>parent of mysqld installation directory</code> |

The path to the MySQL installation directory. This option sets the `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` value. This in turn enables the server to use that `basedir` when searching for server-related information such as the `share` directory containing error messages.

- `--character-set-client-handshake`

|                     |                                                          |
|---------------------|----------------------------------------------------------|
| Command-Line Format | <code>--character-set-client-handshake[={OFF ON}]</code> |
| 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`; this makes MySQL behave like MySQL 4.0.

- `--chroot=dir_name, -r dir_name`

|                     |                                |
|---------------------|--------------------------------|
| Command-Line Format | <code>--chroot=dir_name</code> |
| Type                | Directory name                 |

Put the `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` and `SELECT ... INTO OUTFILE`.

- `--console`

|                     |                        |
|---------------------|------------------------|
| Command-Line Format | <code>--console</code> |
| 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”](#). `mysqld` does not close the console window if this option is used.

`--console` takes precedence over `--log-error` if both are given.

- `--core-file`

|                     |                                     |
|---------------------|-------------------------------------|
| Command-Line Format | <code>--core-file[={OFF ON}]</code> |
| Type                | Boolean                             |
| Default Value       | <code>OFF</code>                    |

Write a core file if `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` 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` option to `mysqld_safe`. See [Section 4.3.2, “mysqld\\_safe — MySQL Server Startup Script”](#). On some systems, such as Solaris, you do not get a core file if you are also using the `--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` 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”](#).

- `--daemonize, -D`

|                     |                                     |
|---------------------|-------------------------------------|
| Command-Line Format | <code>--daemonize[={OFF ON}]</code> |
| 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”](#).

`--daemonize` is mutually exclusive with `--initialize` and `--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`.

- `--datadir=dir_name`, `-h dir_name`

|                                   |                                 |
|-----------------------------------|---------------------------------|
| Command-Line Format               | <code>--datadir=dir_name</code> |
| System Variable                   | <code>datadir</code>            |
| Scope                             | Global                          |
| Dynamic                           | No                              |
| <code>SET_VAR</code> Hint Applies | No                              |
| Type                              | Directory name                  |

The path to the MySQL server data directory. This option sets the `datadir` system variable. See the description of that variable.

- `--debug[=debug_options]`, `-# [debug_options]`

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| Command-Line Format               | <code>--debug[=debug_options]</code>   |
| System Variable                   | <code>debug</code>                     |
| Scope                             | Global, Session                        |
| Dynamic                           | Yes                                    |
| <code>SET_VAR</code> Hint Applies | No                                     |
| Type                              | String                                 |
| Default Value (Unix)              | <code>d:t:i:o,/tmp/mysqld.trace</code> |
| Default Value (Windows)           | <code>d:t:i:o,\mysqld.trace</code>     |

If MySQL is configured with the `-DWITH_DEBUG=1` CMake option, you can use this option to get a trace file of what `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` to configure MySQL with debugging support enables you to use the `--debug="d,parser_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 --debug=+P` sets the value to `P:T`.

For more information, see [Section 5.9.4, “The DEBUG Package”](#).

- `--debug-sync-timeout[=N]`

|                     |                                       |     |
|---------------------|---------------------------------------|-----|
| Command-Line Format | <code>--debug-sync-timeout[=#]</code> | 749 |
|---------------------|---------------------------------------|-----|

|      |         |
|------|---------|
| 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 `-DWITH_DEBUG=ON CMake` option (see [Section 2.8.7, “MySQL Source-Configuration Options”](#)); otherwise, 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](#).

- `--default-time-zone=timezone`

|                     |                                       |
|---------------------|---------------------------------------|
| Command-Line Format | <code>--default-time-zone=name</code> |
| Type                | String                                |

Set the default server time zone. This option sets the global `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` system variable).

The `system_time_zone` variable differs from `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”](#).

- `--defaults-extra-file=file_name`

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”](#).

- `--defaults-file=file_name`

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`, `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` and `--install` (or `--install-manual`) options, `--install` (or `--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”](#).

- `--defaults-group-suffix=str`

Read not only the usual option groups, but also groups with the usual names and a suffix of `str`. For example, `mysqld` normally reads the `[mysqld]` group. If this option is given as `--defaults-group-suffix=_other`, `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”](#).

- `--early-plugin-load=plugin_list`

|                     |                                              |
|---------------------|----------------------------------------------|
| Command-Line Format | <code>--early-plugin-load=plugin_list</code> |
| Type                | String                                       |
| Default Value       | <code>empty string</code>                    |

This option tells the server which plugins to load before loading mandatory built-in plugins and before storage engine initialization. Early loading is supported only for plugins compiled with `PLUGIN_OPT_ALLOW_EARLY`. If multiple `--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 library. The server looks for plugin library files in the directory named by the `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` only. After a restart, the plugin is not loaded early unless `--early-plugin-load` is used again.

If the server is started using `--initialize` or `--initialize-insecure`, plugins specified by `--early-plugin-load` are not loaded.

If the server is run with `--help`, plugins specified by `--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` 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”](#). For general information about plugin loading, see [Section 5.6.1, “Installing and Uninstalling Plugins”](#).



#### 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”](#).

- `--exit-info[=flags]`, `-T [flags]`

|                     |                                  |
|---------------------|----------------------------------|
| Command-Line Format | <code>--exit-info[=flags]</code> |
| Type                | Integer                          |

This is a bitmask of different flags that you can use for debugging the `mysqld` server. Do not use this option unless you know exactly what it does!

- `--external-locking`

|                     |                                            |
|---------------------|--------------------------------------------|
| Command-Line Format | <code>--external-locking[={OFF ON}]</code> |
| Type                | Boolean                                    |
| Default Value       | <code>OFF</code>                           |

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` to deadlock.

To disable external locking explicitly, use `--skip-external-locking`.

External locking affects only `MyISAM` table access. For more information, including conditions under which it can and cannot be used, see [Section 8.11.5, “External Locking”](#).

- `--flush`

|                                   |                                 |
|-----------------------------------|---------------------------------|
| Command-Line Format               | <code>--flush[={OFF ON}]</code> |
| System Variable                   | <code>flush</code>              |
| Scope                             | Global                          |
| Dynamic                           | Yes                             |
| <code>SET_VAR</code> Hint Applies | No                              |
| Type                              | Boolean                         |
| Default Value                     | <code>OFF</code>                |

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”](#).



#### Note

If `--flush` is specified, the value of `flush_time` does not matter and changes to `flush_time` have no effect on flush behavior.

- `--gdb`

|                     |                               |
|---------------------|-------------------------------|
| Command-Line Format | <code>--gdb[={OFF ON}]</code> |
| Type                | Boolean                       |
| Default Value       | <code>OFF</code>              |

Install an interrupt handler for `SIGINT` (needed to stop `mysqld` with `^C` to set breakpoints) and disable stack tracing and core file handling. See [Section 5.9.1.4, “Debugging mysqld under gdb”](#).

On Windows, this option also suppresses the forking that is used to implement the `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` suppresses forking. For a server started with this option, `RESTART` simply exits and does not restart.

In non-debug settings, `--no-monitor` may be used to suppress forking the monitor process.

- `--initialize, -I`

|                     |                                      |
|---------------------|--------------------------------------|
| Command-Line Format | <code>--initialize[={OFF ON}]</code> |
| Type                | Boolean                              |
| Default Value       | <code>OFF</code>                     |

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 2.9.1, “Initializing the Data Directory”](#).

When the server is started with `--initialize`, some functionality is unavailable that limits the statements permitted in any file named by the `init_file` system variable. For more information, see the description of that variable. In addition, the `disabled_storage_engines` system variable has no effect.

The `--ndbcluster` option is ignored when used together with `--initialize`.

`--initialize` is mutually exclusive with `--daemonize`.

`-I` is a synonym for `--initialize`.

- `--initialize-insecure`

|                     |                                               |
|---------------------|-----------------------------------------------|
| Command-Line Format | <code>--initialize-insecure[={OFF ON}]</code> |
| 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`. For more information, see the description of that option, and [Section 2.9.1, “Initializing the Data Directory”](#).

`--initialize-insecure` is mutually exclusive with `--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”](#).

- `--install [service_name]`

|                     |                                       |
|---------------------|---------------------------------------|
| Command-Line Format | <code>--install [service_name]</code> |
| 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”](#).



#### Note

If the server is started with the `--defaults-file` and `--install` options, `--install` must be first.

- `--install-manual [service_name]`

|                     |                                              |
|---------------------|----------------------------------------------|
| Command-Line Format | <code>--install-manual [service_name]</code> |
|---------------------|----------------------------------------------|

## 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”](#).

**Note**

If the server is started with the `--defaults-file` and `--install-manual` options, `--install-manual` must be first.

- `--language=lang_name`, `-L lang_name`

|                                   |                                                    |
|-----------------------------------|----------------------------------------------------|
| Command-Line Format               | <code>--language=name</code>                       |
| Deprecated                        | Yes; use <code>lc-messages-dir</code> instead      |
| System Variable                   | <code>language</code>                              |
| Scope                             | Global                                             |
| Dynamic                           | No                                                 |
| <code>SET_VAR</code> Hint Applies | No                                                 |
| Type                              | Directory name                                     |
| Default Value                     | <code>/usr/local/mysql/share/mysql/english/</code> |

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”](#).

`--lc-messages-dir` and `--lc-messages` should be used rather than `--language`, which is deprecated (and handled as a synonym for `--lc-messages-dir`). You should expect the `--language` option to be removed in a future MySQL release.

- `--large-pages`

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Command-Line Format               | <code>--large-pages[={OFF ON}]</code> |
| System Variable                   | <code>large_pages</code>              |
| Scope                             | Global                                |
| Dynamic                           | No                                    |
| <code>SET_VAR</code> Hint Applies | No                                    |
| Platform Specific                 | Linux                                 |
| Type                              | Boolean                               |
| Default Value                     | <code>OFF</code>                      |

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 8.12.3.3, “Enabling Large Page Support”](#). For Solaris support of large pages, see the description of the `--super-large-pages` option.

`--large-pages` is disabled by default.

- `--lc-messages=locale_name`

|                                   |                                 |
|-----------------------------------|---------------------------------|
| Command-Line Format               | <code>--lc-messages=name</code> |
| System Variable                   | <code>lc_messages</code>        |
| Scope                             | Global, Session                 |
| Dynamic                           | Yes                             |
| <code>SET_VAR</code> Hint Applies | No                              |
| Type                              | String                          |
| Default Value                     | <code>en_US</code>              |

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` to produce the location for the error message file. See [Section 10.12, “Setting the Error Message Language”](#).

- `--lc-messages-dir=dir_name`

|                                   |                                         |
|-----------------------------------|-----------------------------------------|
| Command-Line Format               | <code>--lc-messages-dir=dir_name</code> |
| System Variable                   | <code>lc_messages_dir</code>            |
| Scope                             | Global                                  |
| Dynamic                           | No                                      |
| <code>SET_VAR</code> 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` to produce the location for the error message file. See [Section 10.12, “Setting the Error Message Language”](#).

- `--local-service`

|                     |                              |
|---------------------|------------------------------|
| Command-Line Format | <code>--local-service</code> |
|---------------------|------------------------------|

(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` 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”](#).

- `--log-error[=file_name]`

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| Command-Line Format               | <code>--log-error[=file_name]</code> |
| System Variable                   | <code>log_error</code>               |
| Scope                             | Global                               |
| Dynamic                           | No                                   |
| <code>SET_VAR</code> 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”](#).

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` 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` takes precedence over `--log-error` if both are given. In this case, the default error log destination is the console rather than a file.

- `--log-isam[=file_name]`

|                     |                                     |
|---------------------|-------------------------------------|
| Command-Line Format | <code>--log-isam[=file_name]</code> |
| Type                | File name                           |

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

- `--log-raw`

|                                                     |                                   |
|-----------------------------------------------------|-----------------------------------|
| Command-Line Format                                 | <code>--log-raw[={OFF ON}]</code> |
| System Variable ( $\geq 8.0.19$ )                   | <code>log_raw</code>              |
| Scope ( $\geq 8.0.19$ )                             | Global                            |
| Dynamic ( $\geq 8.0.19$ )                           | Yes                               |
| <code>SET_VAR</code> Hint Applies ( $\geq 8.0.19$ ) | No                                |
| Type                                                | Boolean                           |
| Default Value                                       | <code>OFF</code>                  |

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` 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` option affects statement logging as follows:

- Without `--log-raw`, the server logs the statement returned by the query rewrite plugin. This may differ from the statement as received.
- With `--log-raw`, the server logs the original statement as received.

For more information, see [Section 6.1.2.3, “Passwords and Logging”](#).

- `--log-short-format`

|                     |                                            |
|---------------------|--------------------------------------------|
| Command-Line Format | <code>--log-short-format[={OFF ON}]</code> |
| Type                | Boolean                                    |
| Default Value       | <code>OFF</code>                           |

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

- `--log-tc=file_name`

|                     |                                 |
|---------------------|---------------------------------|
| Command-Line Format | <code>--log-tc=file_name</code> |
| Type                | File name                       |

|               |                     |
|---------------|---------------------|
| Default Value | <code>tc.log</code> |
|---------------|---------------------|

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=size`

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

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`

|                     |                                       |
|---------------------|---------------------------------------|
| Command-Line Format | <code>--memlock [= {OFF   ON}]</code> |
| Type                | Boolean                               |
| Default Value       | <code>OFF</code>                      |

Lock the `mysqld` process in memory. This option might help if you have a problem where the operating system is causing `mysqld` to swap to disk.

`--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:

```
$> 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”](#).

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 8.12.3.3, “Enabling 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` is very likely to exit as soon as you try to start it.

- `--myisam-block-size=N`

|                     |                                    |
|---------------------|------------------------------------|
| Command-Line Format | <code>--myisam-block-size=#</code> |
| Type                | Integer                            |

|               |                    |
|---------------|--------------------|
| Default Value | <code>1024</code>  |
| Minimum Value | <code>1024</code>  |
| Maximum Value | <code>16384</code> |

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

- `--no-defaults`

Do not read any option files. If program startup fails due to reading unknown options from an option file, `--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”](#).

- `--no-dd-upgrade`

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



#### Note

This option is deprecated as of MySQL 8.0.16. It is superseded by the `--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` 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`

|                     |                                      |
|---------------------|--------------------------------------|
| Command-Line Format | <code>--no-monitor[={OFF ON}]</code> |
| Introduced          | <code>8.0.12</code>                  |
| Platform Specific   | Windows                              |
| Type                | Boolean                              |

|               |     |
|---------------|-----|
| Default Value | OFF |
|---------------|-----|

(Windows only). This option suppresses the forking that is used to implement the [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](#) simply exits and does not restart.

[--no-monitor](#) is not available prior to MySQL 8.0.12. The [--gdb](#) option can be used as a workaround.

- [--old-style-user-limits](#)

|                     |                                                 |
|---------------------|-------------------------------------------------|
| Command-Line Format | <code>--old-style-user-limits[={OFF ON}]</code> |
| Deprecated          | 8.0.30                                          |
| 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 6.2.21, “Setting Account Resource Limits”](#).

This option is deprecated, and, as of MySQL 8.0.30, using it on the command line or in an option file causes MySQL to raise a warning. Expect this option to be removed in a future release; you should check your applications now for use of [--old-style-user-limits](#) and remove any dependencies they might have on it, before this happens.

- [--performance-schema-xxx](#)

Configure a Performance Schema option. For details, see [Section 27.14, “Performance Schema Command Options”](#).

- [--plugin-load=plugin\\_list](#)

|                     |                                        |
|---------------------|----------------------------------------|
| Command-Line Format | <code>--plugin-load=plugin_list</code> |
| Type                | String                                 |

This option tells the server to load the named plugins at startup. If multiple [--plugin-load](#) options are given, only the last one applies. Additional plugins to load may be specified using [--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 library. The server looks for plugin library files in the directory named by the [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](#) only. After a restart, the plugin is not loaded unless [--plugin-load](#) is used again. This is in contrast to [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` option, plugins registered in the `mysql.plugins` table are not loaded and are unavailable. `--plugin-load` enables plugins to be loaded even when `--skip-grant-tables` is given. `--plugin-load` also enables plugins to be loaded at startup that cannot be loaded at runtime.

This option does not set a corresponding system variable. The output of `SHOW PLUGINS` provides information about loaded plugins. More detailed information can be found in the Information Schema `PLUGINS` table. See [Section 5.6.2, “Obtaining Server Plugin Information”](#).

For additional information about plugin loading, see [Section 5.6.1, “Installing and Uninstalling Plugins”](#).

- `--plugin-load-add=plugin_list`

|                     |                                            |
|---------------------|--------------------------------------------|
| Command-Line Format | <code>--plugin-load-add=plugin_list</code> |
| Type                | String                                     |

This option complements the `--plugin-load` option. `--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`. `--plugin-load-add` can be used to avoid specifying a large set of plugins as a single long unwieldy `--plugin-load` argument.

`--plugin-load-add` can be given in the absence of `--plugin-load`, but any instance of `--plugin-load-add` that appears before `--plugin-load` has no effect because `--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
```

This option does not set a corresponding system variable. The output of `SHOW PLUGINS` provides information about loaded plugins. More detailed information can be found in the Information Schema `PLUGINS` table. See [Section 5.6.2, “Obtaining Server Plugin Information”](#).

For additional information about plugin loading, see [Section 5.6.1, “Installing and Uninstalling Plugins”](#).

- `--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` option for `InnoDB` can be specified as `--plugin-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”](#)). For example, `--skip-plugin-innodb-file-per-table` disables `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`, 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=port_num`, `-P port_num`

|                                   |                              |
|-----------------------------------|------------------------------|
| Command-Line Format               | <code>--port=port_num</code> |
| System Variable                   | <code>port</code>            |
| Scope                             | Global                       |
| Dynamic                           | No                           |
| <code>SET_VAR</code> 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=num`

|                     |                                    |
|---------------------|------------------------------------|
| Command-Line Format | <code>--port-open-timeout=#</code> |
| 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`

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` or `--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”](#).

- `--remove [service_name]`

|                     |                                      |
|---------------------|--------------------------------------|
| Command-Line Format | <code>--remove [service_name]</code> |
|---------------------|--------------------------------------|

|                   |         |
|-------------------|---------|
| 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”](#).

- `--safe-user-create`

|                     |                                            |
|---------------------|--------------------------------------------|
| Command-Line Format | <code>--safe-user-create[={OFF ON}]</code> |
| Type                | Boolean                                    |
| Default Value       | <code>OFF</code>                           |

If this option is enabled, a user cannot create new MySQL users by using the `GRANT` statement unless the user has the `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` statement to give privileges to other users.

- `--skip-grant-tables`

|                     |                                             |
|---------------------|---------------------------------------------|
| Command-Line Format | <code>--skip-grant-tables[={OFF ON}]</code> |
| Type                | Boolean                                     |
| Default Value       | <code>OFF</code>                            |

This option affects the server startup sequence:

- `--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` disables authentication checks, the server also disables remote connections in that case by enabling `skip_networking`.

To cause a server started with `--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` statement after connecting to the server.
- Execute a `mysqladmin flush-privileges` or `mysqladmin reload` 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` disables failed-login tracking and temporary account locking because those capabilities depend on the grant tables. See [Section 6.2.15, “Password Management”](#).
- `--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` and registered in the `events` data dictionary table.
  - Plugins installed using `INSTALL PLUGIN` and registered in the `mysql.plugin` system table.

To cause plugins to be loaded even when using `--skip-grant-tables`, use the `--plugin-load` or `--plugin-load-add` option.

- Loadable functions installed using `CREATE FUNCTION` and registered in the `mysql.func` system table.
- `--skip-grant-tables` does *not* suppress loading during startup of components.
- `--skip-grant-tables` causes the `disabled_storage_engines` system variable to have no effect.
  - `--skip-host-cache`

|                     |                                |
|---------------------|--------------------------------|
| Command-Line Format | <code>--skip-host-cache</code> |
| Deprecated          | 8.0.30                         |

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` is similar to setting the `host_cache_size` system variable to 0, but `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.

Beginning with MySQL 8.0.30, this option is deprecated; you should use `SET GLOBAL host_cache_size = 0` instead.

Starting the server with `--skip-host-cache` does not prevent runtime changes to the value of `host_cache_size`, but such changes have no effect and the cache is not re-enabled even if `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”](#).

- `--skip-innodb`

Disable the `InnoDB` storage engine. In this case, because the default storage engine is `InnoDB`, the server does not start unless you also use `--default-storage-engine` and `--default-temp-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` 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`

|                     |                         |
|---------------------|-------------------------|
| Command-Line Format | <code>--skip-new</code> |
|---------------------|-------------------------|

This option disables (what used to be considered) new, possibly unsafe behaviors. It results in these settings: `delay_key_write=OFF`, `concurrent_insert=NEVER`, `automatic_sp_privileges=OFF`. It also causes `OPTIMIZE TABLE` to be mapped to `ALTER TABLE` for storage engines for which `OPTIMIZE TABLE` is not supported.

- `--skip-show-database`

|                     |                                   |
|---------------------|-----------------------------------|
| Command-Line Format | <code>--skip-show-database</code> |
| System Variable     | <code>skip_show_database</code>   |
| Scope               | Global                            |

|                                   |         |
|-----------------------------------|---------|
| Dynamic                           | No      |
| <code>SET_VAR</code> Hint Applies | No      |
| Type                              | Boolean |
| Default Value                     | OFF     |

This option sets the `skip_show_database` system variable that controls who is permitted to use the `SHOW DATABASES` statement. See [Section 5.1.8, “Server System Variables”](#).

- `--skip-stack-trace`

|                     |                                 |
|---------------------|---------------------------------|
| Command-Line Format | <code>--skip-stack-trace</code> |
|---------------------|---------------------------------|

Do not write stack traces. This option is useful when you are running `mysqld` under a debugger. On some systems, you also must use this option to get a core file. See [Section 5.9, “Debugging MySQL”](#).

- `--slow-start-timeout=timeout`

|                     |                                     |
|---------------------|-------------------------------------|
| Command-Line Format | <code>--slow-start-timeout=#</code> |
| 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=path`

|                                   |                                             |
|-----------------------------------|---------------------------------------------|
| Command-Line Format               | <code>--socket={file_name pipe_name}</code> |
| System Variable                   | <code>socket</code>                         |
| Scope                             | Global                                      |
| Dynamic                           | No                                          |
| <code>SET_VAR</code> Hint Applies | No                                          |
| Type                              | String                                      |
| Default Value (Windows)           | MySQL                                       |
| Default Value (Other)             | <code>/tmp/mysql.sock</code>                |

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=value[,value...,value...]`

|                                   |                              |
|-----------------------------------|------------------------------|
| Command-Line Format               | <code>--sql-mode=name</code> |
| System Variable                   | <code>sql_mode</code>        |
| Scope                             | Global, Session              |
| Dynamic                           | Yes                          |
| <code>SET_VAR</code> Hint Applies | Yes                          |
| Type                              | Set                          |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Default Value | <code>ONLY_FULL_GROUP_BY</code><br><code>STRICT_TRANS_TABLES</code><br><code>NO_ZERO_IN_DATE NO_ZERO_DATE</code><br><code>ERROR_FOR_DIVISION_BY_ZERO</code><br><code>NO_ENGINE_SUBSTITUTION</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Valid Values  | <code>ALLOW_INVALID_DATES</code><br><br><code>ANSI_QUOTES</code><br><br><code>ERROR_FOR_DIVISION_BY_ZERO</code><br><br><code>HIGH_NOT_PRECEDENCE</code><br><br><code>IGNORE_SPACE</code><br><br><code>NO_AUTO_VALUE_ON_ZERO</code><br><br><code>NO_BACKSLASH_ESCAPES</code><br><br><code>NO_DIR_IN_CREATE</code><br><br><code>NO_ENGINE_SUBSTITUTION</code><br><br><code>NO_UNSIGNED_SUBTRACTION</code><br><br><code>NO_ZERO_DATE</code><br><br><code>NO_ZERO_IN_DATE</code><br><br><code>ONLY_FULL_GROUP_BY</code><br><br><code>PAD_CHAR_TO_FULL_LENGTH</code><br><br><code>PIPES_AS_CONCAT</code><br><br><code>REAL_AS_FLOAT</code><br><br><code>STRICT_ALL_TABLES</code><br><br><code>STRICT_TRANS_TABLES</code><br><br><code>TIME_TRUNCATE_FRACTIONAL</code> |

Set the SQL mode. See [Section 5.1.11, “Server SQL Modes”](#).



#### 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`, `--skip-ssl`

|                     |                               |
|---------------------|-------------------------------|
| Command-Line Format | <code>--ssl[={OFF ON}]</code> |
| Deprecated          | 8.0.26                        |
| Disabled by         | <code>skip-ssl</code>         |
| Type                | Boolean                       |

|               |    |
|---------------|----|
| Default Value | ON |
|---------------|----|

The `--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`, is like the `--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”](#).

`--ssl` can be specified in negated form as `--skip-ssl` or a synonym (`--ssl=OFF`, `--disable-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` 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` at runtime. For example, you can use `--ssl=OFF` 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”](#), which also describes server capabilities for certificate and key file autogeneration and autodiscovery. Consider setting at least the `ssl_cert` and `ssl_key` system variables on the server side and the `--ssl-ca` (or `--ssl-capath`) option on the client side.

Because support for encrypted connections is enabled by default, it is normally unnecessary to specify `--ssl`. As of MySQL 8.0.26, `--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` in negated form. Set the `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`

|                     |                           |
|---------------------|---------------------------|
| Command-Line Format | <code>--standalone</code> |
| Platform Specific   | Windows                   |

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

- `--super-large-pages`

|                     |                                             |
|---------------------|---------------------------------------------|
| Command-Line Format | <code>--super-large-pages[={OFF ON}]</code> |
| 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` or `--skip-super-large-pages` option.

- `--symbolic-links`, `--skip-symbolic-links`

|                     |                                          |
|---------------------|------------------------------------------|
| Command-Line Format | <code>--symbolic-links[={OFF ON}]</code> |
| 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](#) 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”](#).

**Note**

Symbolic link support, along with the [--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](#) system variable also is deprecated; expect it to be removed in a future version of MySQL.

This option has no meaning on Windows.

- [--sysdate-is-now](#)

|                     |                                          |
|---------------------|------------------------------------------|
| Command-Line Format | <code>--sysdate-is-now[={OFF ON}]</code> |
| Type                | Boolean                                  |
| Default Value       | OFF                                      |

[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\(\)](#). This option causes [SYSDATE\(\)](#) to be a synonym for [NOW\(\)](#). For information about the implications for binary logging and replication, see the description for [SYSDATE\(\)](#) in [Section 12.7, “Date and Time Functions”](#) and for [SET TIMESTAMP](#) in [Section 5.1.8, “Server System Variables”](#).

- [--tc-heuristic-recover={COMMIT|ROLLBACK}](#)

|                     |                                          |
|---------------------|------------------------------------------|
| Command-Line Format | <code>--tc-heuristic-recover=name</code> |
| Type                | Enumeration                              |
| Default Value       | OFF                                      |
| Valid Values        | OFF<br>COMMIT<br>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=level](#)

|                     |                                           |     |
|---------------------|-------------------------------------------|-----|
| Command-Line Format | <code>--transaction-isolation=name</code> | 767 |
|---------------------|-------------------------------------------|-----|

|                                   |                                                                                                                           |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| System Variable                   | <code>transaction_isolation</code>                                                                                        |
| Scope                             | Global, Session                                                                                                           |
| Dynamic                           | Yes                                                                                                                       |
| <code>SET_VAR</code> Hint Applies | No                                                                                                                        |
| Type                              | Enumeration                                                                                                               |
| Default Value                     | <code>REPEATABLE-READ</code>                                                                                              |
| Valid Values                      | <code>READ-UNCOMMITTED</code><br><code>READ-COMMITTED</code><br><code>REPEATABLE-READ</code><br><code>SERIALIZABLE</code> |

Sets the default transaction isolation level. The `level` value can be `READ-UNCOMMITTED`, `READ-COMMITTED`, `REPEATABLE-READ`, or `SERIALIZABLE`. See [Section 13.3.7, “SET TRANSACTION Statement”](#).

The default transaction isolation level can also be set at runtime using the `SET TRANSACTION` statement or by setting the `transaction_isolation` system variable.

- `--transaction-read-only`

|                                   |                                                 |
|-----------------------------------|-------------------------------------------------|
| Command-Line Format               | <code>--transaction-read-only[={OFF ON}]</code> |
| System Variable                   | <code>transaction_read_only</code>              |
| Scope                             | Global, Session                                 |
| Dynamic                           | Yes                                             |
| <code>SET_VAR</code> Hint Applies | No                                              |
| Type                              | Boolean                                         |
| Default Value                     | <code>OFF</code>                                |

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` statement or set the `transaction_read_only` system variable. See [Section 13.3.7, “SET TRANSACTION Statement”](#).

- `--tmpdir=dir_name, -t dir_name`

|                                   |                                |
|-----------------------------------|--------------------------------|
| Command-Line Format               | <code>--tmpdir=dir_name</code> |
| System Variable                   | <code>tmpdir</code>            |
| Scope                             | Global                         |
| Dynamic                           | No                             |
| <code>SET_VAR</code> 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` 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`, consider setting a different temporary directory for the replica using the `replica_load_tmpdir` or `slave_load_tmpdir` system variable. For a replica, the temporary files used to replicate `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”](#).

- `--upgrade=value`

|                     |                                                                |
|---------------------|----------------------------------------------------------------|
| Command-Line Format | <code>--upgrade=value</code>                                   |
| Introduced          | 8.0.16                                                         |
| Type                | Enumeration                                                    |
| Default Value       | <code>AUTO</code>                                              |
| Valid Values        | <code>AUTO</code><br><code>NONE</code><br><code>MINIMAL</code> |

|  |       |
|--|-------|
|  | 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 2.10.3, “What the MySQL Upgrade Process Upgrades”](#).

These `--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` 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? |
|----------------------|-------------------------|-------------------------|
| <code>AUTO</code>    | If necessary            | If necessary            |
| <code>NONE</code>    | No                      | No                      |
| <code>MINIMAL</code> | If necessary            | No                      |
| <code>FORCE</code>   | If necessary            | Yes                     |

- `--user={user_name|user_id}, -u {user_name|user_id}`

|                     |                          |
|---------------------|--------------------------|
| Command-Line Format | <code>--user=name</code> |
| Type                | String                   |

Run the `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` 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”](#).

To avoid a possible security hole where a user adds a `--user=root` option to a `my.cnf` file (thus causing the server to run as `root`), `mysqld` uses only the first `--user` option specified and produces a warning if there are multiple `--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` option in `/etc/my.cnf` and specify a value other than `root`. The option in `/etc/my.cnf` is found before any other `--user` options, which ensures that the server runs as a user other than `root`, and that a warning results if any other `--user` option is found.

- `--validate-config`

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

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` 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”](#).

- `--validate-user-plugins[={OFF|ON}]`

|                     |                                                 |
|---------------------|-------------------------------------------------|
| Command-Line Format | <code>--validate-user-plugins[={OFF ON}]</code> |
| 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` slows down server initialization and `FLUSH PRIVILEGES`. If you do not require the additional checking, you can disable this option at startup to avoid the performance decrement.

- `--verbose, -v`

Use this option with the `--help` option for detailed help.

- `--version, -V`

Display version information and exit.

## 5.1.8 Server System Variables

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` 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` privilege (or the deprecated `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”](#)

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` statement or the Performance Schema system variable tables. See [Section 27.12.14, “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”](#). For more information about manipulation of system variables, see [Section 5.1.9, “Using System Variables”](#).

For additional system variable information, see these sections:

- [Section 5.1.9, “Using System Variables”](#), discusses the syntax for setting and displaying system variable values.
- [Section 5.1.9.2, “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”](#).