

# **Building MySQL from Source**

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## Abstract

This is the Building MySQL from Source extract from the MySQL 5.7 Reference Manual.

For legal information, see the [Legal Notices](#).

For help with using MySQL, please visit the [MySQL Forums](#), where you can discuss your issues with other MySQL users.

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# Chapter 1 Installing MySQL from Source

Building MySQL from the source code enables you to customize build parameters, compiler optimizations, and installation location. For a list of systems on which MySQL is known to run, see <https://www.mysql.com/support/supportedplatforms/database.html>.

Before you proceed with an installation from source, check whether Oracle produces a precompiled binary distribution for your platform and whether it works for you. We put a great deal of effort into ensuring that our binaries are built with the best possible options for optimal performance. Instructions for installing binary distributions are available in [Installing MySQL on Unix/Linux Using Generic Binaries](#).

If you are interested in building MySQL from a source distribution using build options the same as or similar to those use by Oracle to produce binary distributions on your platform, obtain a binary distribution, unpack it, and look in the `docs/INFO_BIN` file, which contains information about how that MySQL distribution was configured and compiled.

## **Warning**

Building MySQL with nonstandard options may lead to reduced functionality, performance, or security.





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## Chapter 2 Installing MySQL Using a Standard Source Distribution

To install MySQL from a standard source distribution:

1. Verify that your system satisfies the tool requirements listed at [Source Installation Prerequisites](#).
2. Obtain a distribution file using the instructions in [How to Get MySQL](#).
3. Configure, build, and install the distribution using the instructions in this section.
4. Perform postinstallation procedures using the instructions in [Postinstallation Setup and Testing](#).

MySQL uses [CMake](#) as the build framework on all platforms. The instructions given here should enable you to produce a working installation. For additional information on using [CMake](#) to build MySQL, see [How to Build MySQL Server with CMake](#).

If you start from a source RPM, use the following command to make a binary RPM that you can install. If you do not have `rpmbuild`, use `rpm` instead.

```
shell> rpmbuild --rebuild --clean MySQL-VERSION.src.rpm
```

The result is one or more binary RPM packages that you install as indicated in [Installing MySQL on Linux Using RPM Packages from Oracle](#).

The sequence for installation from a compressed `tar` file or Zip archive source distribution is similar to the process for installing from a generic binary distribution (see [Installing MySQL on Unix/Linux Using Generic Binaries](#)), except that it is used on all platforms and includes steps to configure and compile the distribution. For example, with a compressed `tar` file source distribution on Unix, the basic installation command sequence looks like this:

```
# Preconfiguration setup
shell> groupadd mysql
shell> useradd -r -g mysql -s /bin/false mysql
# Beginning of source-build specific instructions
shell> tar zxvf mysql-VERSION.tar.gz
shell> cd mysql-VERSION
shell> mkdir bld
shell> cd bld
shell> cmake ..
shell> make
shell> make install
# End of source-build specific instructions
# Postinstallation setup
shell> cd /usr/local/mysql
shell> mkdir mysql-files
shell> chown mysql:mysql mysql-files
shell> chmod 750 mysql-files
shell> bin/mysqld --initialize --user=mysql
shell> bin/mysql_ssl_rsa_setup
shell> bin/mysqld_safe --user=mysql &
# Next command is optional
shell> cp support-files/mysql.server /etc/init.d/mysql.server
```

A more detailed version of the source-build specific instructions is shown following.

### Note

The procedure shown here does not set up any passwords for MySQL accounts. After following the procedure, proceed to [Postinstallation Setup and Testing](#), for postinstallation setup and testing.

- [Perform Preconfiguration Setup](#)
- [Obtain and Unpack the Distribution](#)
- [Configure the Distribution](#)
- [Build the Distribution](#)
- [Install the Distribution](#)
- [Perform Postinstallation Setup](#)

## Perform Preconfiguration Setup

On Unix, set up the `mysql` user and group to be used to run and execute the MySQL server and own the database directory. For details, see [Create a mysql User and Group](#). Then perform the following steps as the `mysql` user, except as noted.

## Obtain and Unpack the Distribution

Pick the directory under which you want to unpack the distribution and change location into it.

Obtain a distribution file using the instructions in [How to Get MySQL](#).

Unpack the distribution into the current directory:

- To unpack a compressed `tar` file, `tar` can uncompress and unpack the distribution if it has `z` option support:

```
shell> tar zxvf mysql-VERSION.tar.gz
```

If your `tar` does not have `z` option support, use `gunzip` to unpack the distribution and `tar` to unpack it:

```
shell> gunzip < mysql-VERSION.tar.gz | tar xvf -
```

Alternatively, `CMake` can uncompress and unpack the distribution:

```
shell> cmake -E tar zxvf mysql-VERSION.tar.gz
```

- To unpack a Zip archive, use [WinZip](#) or another tool that can read `.zip` files.

Unpacking the distribution file creates a directory named `mysql-VERSION`.

## Configure the Distribution

Change location into the top-level directory of the unpacked distribution:

```
shell> cd mysql-VERSION
```

Build outside of the source tree to keep the tree clean. If the top-level source directory is named `mysql-src` under your current working directory, you can build in a directory named `bld` at the same level. Create the directory and go there:

```
shell> mkdir bld
shell> cd bld
```

Configure the build directory. The minimum configuration command includes no options to override configuration defaults:

```
shell> cmake ../mysql-src
```

The build directory needs not be outside the source tree. For example, you can build in a directory named `bld` under the top-level source tree. To do this, starting with `mysql-src` as your current working directory, create the directory `bld` and then go there:

```
shell> mkdir bld
shell> cd bld
```

Configure the build directory. The minimum configuration command includes no options to override configuration defaults:

```
shell> cmake ..
```

If you have multiple source trees at the same level (for example, to build multiple versions of MySQL), the second strategy can be advantageous. The first strategy places all build directories at the same level, which requires that you choose a unique name for each. With the second strategy, you can use the same name for the build directory within each source tree. The following instructions assume this second strategy.

On Windows, specify the development environment. For example, the following commands configure MySQL for 32-bit or 64-bit builds, respectively:

```
shell> cmake .. -G "Visual Studio 12 2013"
shell> cmake .. -G "Visual Studio 12 2013 Win64"
```

On macOS, to use the Xcode IDE:

```
shell> cmake .. -G Xcode
```

When you run `cmake`, you might want to add options to the command line. Here are some examples:

- `-DBUILD_CONFIG=mysql_release`: Configure the source with the same build options used by Oracle to produce binary distributions for official MySQL releases.
- `-DCMAKE_INSTALL_PREFIX=dir_name`: Configure the distribution for installation under a particular location.
- `-DCPACK_MONOLITHIC_INSTALL=1`: Cause `make package` to generate a single installation file rather than multiple files.
- `-DWITH_DEBUG=1`: Build the distribution with debugging support.

For a more extensive list of options, see [Chapter 4, MySQL Source-Configuration Options](#).

To list the configuration options, use one of the following commands:

```
shell> cmake .. -L # overview
shell> cmake .. -LH # overview with help text
shell> cmake .. -LAH # all params with help text
shell> ccmake .. # interactive display
```

If `CMake` fails, you might need to reconfigure by running it again with different options. If you do reconfigure, take note of the following:

- If `CMake` is run after it has previously been run, it may use information that was gathered during its previous invocation. This information is stored in `CMakeCache.txt`. When `CMake` starts, it looks for that file and reads its contents if it exists, on the assumption that the information is still correct. That assumption is invalid when you reconfigure.

- Each time you run `CMake`, you must run `make` again to recompile. However, you may want to remove old object files from previous builds first because they were compiled using different configuration options.

To prevent old object files or configuration information from being used, run these commands in the build directory on Unix before re-running `CMake`:

```
shell> make clean
shell> rm CMakeCache.txt
```

Or, on Windows:

```
shell> devenv MySQL.sln /clean
shell> del CMakeCache.txt
```

Before asking on the [MySQL Community Slack](#), check the files in the `CMakeFiles` directory for useful information about the failure. To file a bug report, please use the instructions in [How to Report Bugs or Problems](#).

## Build the Distribution

On Unix:

```
shell> make
shell> make VERBOSE=1
```

The second command sets `VERBOSE` to show the commands for each compiled source.

Use `gmake` instead on systems where you are using GNU `make` and it has been installed as `gmake`.

On Windows:

```
shell> devenv MySQL.sln /build RelWithDebInfo
```

If you have gotten to the compilation stage, but the distribution does not build, see [Chapter 5, Dealing with Problems Compiling MySQL](#), for help. If that does not solve the problem, please enter it into our bugs database using the instructions given in [How to Report Bugs or Problems](#). If you have installed the latest versions of the required tools, and they crash trying to process our configuration files, please report that also. However, if you get a `command not found` error or a similar problem for required tools, do not report it. Instead, make sure that all the required tools are installed and that your `PATH` variable is set correctly so that your shell can find them.

## Install the Distribution

On Unix:

```
shell> make install
```

This installs the files under the configured installation directory (by default, `/usr/local/mysql`). You might need to run the command as `root`.

To install in a specific directory, add a `DESTDIR` parameter to the command line:

```
shell> make install DESTDIR="/opt/mysql"
```

Alternatively, generate installation package files that you can install where you like:

```
shell> make package
```

This operation produces one or more `.tar.gz` files that can be installed like generic binary distribution packages. See [Installing MySQL on Unix/Linux Using Generic Binaries](#). If you run `CMake` with `-DCPACK_MONOLITHIC_INSTALL=1`, the operation produces a single file. Otherwise, it produces multiple files.

On Windows, generate the data directory, then create a `.zip` archive installation package:

```
shell> devenv MySQL.sln /build RelWithDebInfo /project initial_database
shell> devenv MySQL.sln /build RelWithDebInfo /project package
```

You can install the resulting `.zip` archive where you like. See [Installing MySQL on Microsoft Windows Using a noinstall ZIP Archive](#).

## Perform Postinstallation Setup

The remainder of the installation process involves setting up the configuration file, creating the core databases, and starting the MySQL server. For instructions, see [Postinstallation Setup and Testing](#).

### Note

The accounts that are listed in the MySQL grant tables initially have no passwords. After starting the server, you should set up passwords for them using the instructions in [Postinstallation Setup and Testing](#).



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## Chapter 3 Installing MySQL Using a Development Source Tree

This section describes how to install MySQL from the latest development source code, which is hosted on [GitHub](#). To obtain the MySQL Server source code from this repository hosting service, you can set up a local MySQL Git repository.

On [GitHub](#), MySQL Server and other MySQL projects are found on the [MySQL](#) page. The MySQL Server project is a single repository that contains branches for several MySQL series.

MySQL officially joined GitHub in September, 2014. For more information about MySQL's move to GitHub, refer to the announcement on the MySQL Release Engineering blog: [MySQL on GitHub](#)

- [Prerequisites for Installing from Development Source](#)
- [Setting Up a MySQL Git Repository](#)

### Prerequisites for Installing from Development Source

To install MySQL from a development source tree, your system must satisfy the tool requirements listed at [Source Installation Prerequisites](#).

### Setting Up a MySQL Git Repository

To set up a MySQL Git repository on your machine:

1. Clone the MySQL Git repository to your machine. The following command clones the MySQL Git repository to a directory named `mysql-server`. The initial download may take some time to complete, depending on the speed of your connection.

```
~$ git clone https://github.com/mysql/mysql-server.git
Cloning into 'mysql-server'...
remote: Counting objects: 1035465, done.
remote: Total 1035465 (delta 0), reused 0 (delta 0)
Receiving objects: 100% (1035465/1035465), 437.48 MiB | 5.10 MiB/s, done.
Resolving deltas: 100% (855607/855607), done.
Checking connectivity... done.
Checking out files: 100% (21902/21902), done.
```

2. When the clone operation completes, the contents of your local MySQL Git repository appear similar to the following:

```
~$ cd mysql-server
~/mysql-server$ ls
client          extra           msys           storage
cmake          include        packaging      strings
CMakeLists.txt INSTALL        plugin         support-files
components     libbinlogevents  README        testclients
config.h.cmake libbinlogstandalone  router        unittest
configure.cmake libmysql        run_doxygen.cmake  utilities
Docs          libservices     scripts        VERSION
Doxyfile-ignored LICENSE        share          vio
Doxyfile.in   man            sql            win
doxygen_resources  mysql-test    sql-common
```

3. Use the `git branch -r` command to view the remote tracking branches for the MySQL repository.

```
~/mysql-server$ git branch -r
origin/5.5
origin/5.6
```

```
origin/5.7
origin/8.0
origin/HEAD -> origin/8.0
origin/cluster-7.2
origin/cluster-7.3
origin/cluster-7.4
origin/cluster-7.5
origin/cluster-7.6
```

4. To view the branch that is checked out in your local repository, issue the `git branch` command. When you clone the MySQL Git repository, the latest MySQL GA branch is checked out automatically. The asterisk identifies the active branch.

```
~/mysql-server$ git branch
* 8.0
```

5. To check out an earlier MySQL branch, run the `git checkout` command, specifying the branch name. For example, to check out the MySQL 5.7 branch:

```
~/mysql-server$ git checkout 5.7
Branch 5.7 set up to track remote branch 5.7 from origin.
Switched to a new branch '5.7'
```

6. To obtain changes made after your initial setup of the MySQL Git repository, switch to the branch you want to update and issue the `git pull` command:

```
~/mysql-server$ git checkout 5.7
~/mysql-server$ git pull
```

To examine the commit history, use the `git log` option:

```
~/mysql-server$ git log
```

You can also browse commit history and source code on the GitHub [MySQL](#) site.

If you see changes or code that you have a question about, ask on the [MySQL Community Slack](#). For information about contributing a patch, see [Contributing to MySQL Server](#).

7. After you have cloned the MySQL Git repository and have checked out the branch you want to build, you can build MySQL Server from the source code. Instructions are provided in [Chapter 2, Installing MySQL Using a Standard Source Distribution](#), except that you skip the part about obtaining and unpacking the distribution.

Be careful about installing a build from a distribution source tree on a production machine. The installation command may overwrite your live release installation. If you already have MySQL installed and do not want to overwrite it, run `CMake` with values for the `CMAKE_INSTALL_PREFIX`, `MYSQL_TCP_PORT`, and `MYSQL_UNIX_ADDR` options different from those used by your production server. For additional information about preventing multiple servers from interfering with each other, see [Running Multiple MySQL Instances on One Machine](#).

Play hard with your new installation. For example, try to make new features crash. Start by running `make test`. See [The MySQL Test Suite](#).



## Chapter 4 MySQL Source-Configuration Options

The `CMake` program provides a great deal of control over how you configure a MySQL source distribution. Typically, you do this using options on the `CMake` command line. For information about options supported by `CMake`, run either of these commands in the top-level source directory:

```
cmake . -LH
ccmake .
```

You can also affect `CMake` using certain environment variables. See [Environment Variables](#).

For boolean options, the value may be specified as 1 or `ON` to enable the option, or as 0 or `OFF` to disable the option.

Many options configure compile-time defaults that can be overridden at server startup. For example, the `CMAKE_INSTALL_PREFIX`, `MYSQL_TCP_PORT`, and `MYSQL_UNIX_ADDR` options that configure the default installation base directory location, TCP/IP port number, and Unix socket file can be changed at server startup with the `--basedir`, `--port`, and `--socket` options for `mysqld`. Where applicable, configuration option descriptions indicate the corresponding `mysqld` startup option.

The following sections provide more information about `CMake` options.

- [CMake Option Reference](#)
- [General Options](#)
- [Installation Layout Options](#)
- [Storage Engine Options](#)
- [Feature Options](#)
- [Compiler Flags](#)
- [CMake Options for Compiling NDB Cluster](#)

### CMake Option Reference

The following table shows the available `CMake` options. In the `Default` column, `PREFIX` stands for the value of the `CMAKE_INSTALL_PREFIX` option, which specifies the installation base directory. This value is used as the parent location for several of the installation subdirectories.

**Table 4.1 MySQL Source-Configuration Option Reference (CMake)**

Formats	Description	Default	Introduced	Removed
<code>BUILD_CONFIG</code>	Use same build options as official releases			
<code>CMAKE_BUILD_TYPE</code>	Type of build to produce	<code>RelWithDebInfo</code>		
<code>CMAKE_CXX_FLAGS</code>	Flags for C++ Compiler			
<code>CMAKE_C_FLAGS</code>	Flags for C Compiler			
<code>CMAKE_INSTALL_PREFIX</code>	Installation base directory	<code>/usr/local/mysql</code>		
<code>COMPILATION_COMMENT</code>	Comment about compilation environment			
<code>CPACK_MONOLITHIC_INSTALL</code>	Whether package build produces single file	<code>OFF</code>		

Formats	Description	Default	Introduced	Removed
DEFAULT_CHARSET	The default server character set	latin1		
DEFAULT_COLLATION	The default server collation	latin1_swedish_ci		
DISABLE_PSI_COND	Exclude Performance Schema condition instrumentation	OFF	5.7.3	
DISABLE_PSI_FILE	Exclude Performance Schema file instrumentation	OFF	5.7.3	
DISABLE_PSI_IDLE	Exclude Performance Schema idle instrumentation	OFF	5.7.3	
DISABLE_PSI_MEMORY	Exclude Performance Schema memory instrumentation	OFF	5.7.3	
DISABLE_PSI_METADATA	Exclude Performance Schema metadata instrumentation	OFF	5.7.3	
DISABLE_PSI_MUTEX	Exclude Performance Schema mutex instrumentation	OFF	5.7.3	
DISABLE_PSI_PS	Exclude the performance schema prepared statements	OFF	5.7.3	
DISABLE_PSI_RWLOCK	Exclude Performance Schema rwlock instrumentation	OFF	5.7.3	
DISABLE_PSI_SOCKET	Exclude Performance Schema socket instrumentation	OFF	5.7.3	
DISABLE_PSI_SP	Exclude Performance Schema stored program instrumentation	OFF	5.7.3	
DISABLE_PSI_STAGE	Exclude Performance Schema stage instrumentation	OFF	5.7.3	
DISABLE_PSI_STATEMENT	Exclude Performance Schema statement instrumentation	OFF	5.7.3	
DISABLE_PSI_STATEMENT_DIGEST	Exclude Performance Schema statements_digest instrumentation	OFF	5.7.3	
DISABLE_PSI_TABLE	Exclude Performance Schema table instrumentation	OFF	5.7.3	
DISABLE_PSI_THREAD	Exclude the performance schema thread instrumentation	OFF	5.7.3	
DISABLE_PSI_TRANSACTION	Exclude the performance schema transaction instrumentation	OFF	5.7.3	
DOWNLOAD_BOOST	Whether to download the Boost library	OFF	5.7.5	
DOWNLOAD_BOOST_TIMEOUT	Timeout in seconds for downloading the Boost library	600	5.7.6	
ENABLED_LOCAL_INFILE	Whether to enable LOCAL for LOAD DATA	OFF		

Formats	Description	Default	Introduced	Removed
<code>ENABLED_PROFILING</code>	Whether to enable query profiling code	ON		
<code>ENABLE_DEBUG_SYNC</code>	Whether to enable Debug Sync support	ON		5.7.1
<code>ENABLE_DOWNLOADS</code>	Whether to download optional files	OFF		
<code>ENABLE_DTRACE</code>	Whether to include DTrace support			
<code>ENABLE_GCOV</code>	Whether to include gcov support			
<code>ENABLE_GPROF</code>	Enable gprof (optimized Linux builds only)	OFF		
<code>FORCE_UNSUPPORTED_COMPILER</code>	Whether to permit unsupported compiler	OFF	5.7.5	
<code>IGNORE_AIO_CHECK</code>	With <code>-DBUILD_CONFIG=mysql_release</code> , ignore libaio check	OFF		
<code>INNODB_PAGE_ATOMIC_REF_COUNTING</code>	Enable or disable atomic page reference counting	ON	5.7.4	5.7.5
<code>INSTALL_BINDIR</code>	User executables directory	<code>PREFIX/bin</code>		
<code>INSTALL_DOCDIR</code>	Documentation directory	<code>PREFIX/docs</code>		
<code>INSTALL_DOCREADMEDIR</code>	README file directory	<code>PREFIX</code>		
<code>INSTALL_INCLUDEDIR</code>	Header file directory	<code>PREFIX/include</code>		
<code>INSTALL_INFODIR</code>	Info file directory	<code>PREFIX/docs</code>		
<code>INSTALL_LAYOUT</code>	Select predefined installation layout	STANDALONE		
<code>INSTALL_LIBDIR</code>	Library file directory	<code>PREFIX/lib</code>		
<code>INSTALL_MANDIR</code>	Manual page directory	<code>PREFIX/man</code>		
<code>INSTALL_MYSQLKEYRINGDIR</code>	Directory for keyring_file plugin data file	platform specific	5.7.11	
<code>INSTALL_MYSQLSHAREDIR</code>	Shared data directory	<code>PREFIX/share</code>		
<code>INSTALL_MYSQLTESTDIR</code>	mysql-test directory	<code>PREFIX/mysql-test</code>		
<code>INSTALL_PKGCONFIGDIR</code>	Directory for <code>mysqlclient.pc</code> pkg-config file	<code>INSTALL_LIBDIR/pkgconfig</code>	5.7.9	
<code>INSTALL_PLUGINDIR</code>	Plugin directory	<code>PREFIX/lib/plugin</code>		
<code>INSTALL_SBINDIR</code>	Server executable directory	<code>PREFIX/bin</code>		
<code>INSTALL_SCRIPTDIR</code>	Scripts directory	<code>PREFIX/scripts</code>		
<code>INSTALL_SECURE_FILE_PRIV_DEFAULT</code>	<code>secure_file_priv</code> default value	platform specific	5.7.6	

Formats	Description	Default	Introduced	Removed
<code>INSTALL_SECURE_FILE_PRIV</code>	secure file priv default value for libmysqld		5.7.8	
<code>INSTALL_SHAREDIR</code>	aclocal/mysql.m4 installation directory	<code>PREFIX/share</code>		
<code>INSTALL_SQLBENCHDIR</code>	sql-bench directory	<code>PREFIX</code>		5.7.8
<code>INSTALL_SUPPORTFILESDIR</code>	Extra support files directory	<code>PREFIX/support-files</code>		
<code>MAX_INDEXES</code>	Maximum indexes per table	64	5.7.1	
<code>MUTEX_TYPE</code>	InnoDB mutex type	<code>event</code>	5.7.2	
<code>MYSQLX_TCP_PORT</code>	TCP/IP port number used by X Plugin	33060	5.7.17	
<code>MYSQLX_UNIX_ADDR</code>	Unix socket file used by X Plugin	<code>/tmp/mysqlx.sock</code>	5.7.15	
<code>MYSQL_DATADIR</code>	Data directory			
<code>MYSQL_MAINTAINER_MODE</code>	Whether to enable MySQL maintainer-specific development environment	<code>OFF</code>		
<code>MYSQL_PROJECT_NAME</code>	Windows/OS X project name	<code>MySQL</code>		
<code>MYSQL_TCP_PORT</code>	TCP/IP port number	3306		
<code>MYSQL_UNIX_ADDR</code>	Unix socket file	<code>/tmp/mysql.sock</code>		
<code>ODBC_INCLUDES</code>	ODBC includes directory			
<code>ODBC_LIB_DIR</code>	ODBC library directory			
<code>OPTIMIZER_TRACE</code>	Whether to support optimizer tracing			
<code>REPRODUCIBLE_BUILD</code>	Take extra care to create a build result independent of build location and time		5.7.19	
<code>SUNPRO_CXX_LIBRARY</code>	Client link library on Solaris 10+		5.7.5	
<code>SYSCONFDIR</code>	Option file directory			
<code>SYSTEMD_PID_DIR</code>	Directory for PID file under systemd	<code>/var/run/mysqld</code>	5.7.6	
<code>SYSTEMD_SERVICE_NAME</code>	Name of MySQL service under systemd	<code>mysqld</code>	5.7.6	
<code>TMPDIR</code>	tmpdir default value		5.7.4	
<code>WIN_DEBUG_NO_INLINE</code>	Whether to disable function inlining	<code>OFF</code>	5.7.6	
<code>WITHOUT_xxx_STORAGE_ENGINE</code>	Exclude storage engine xxx from build			
<code>WITH_ASAN</code>	Enable AddressSanitizer	<code>OFF</code>	5.7.3	

Formats	Description	Default	Introduced	Removed
<code>WITH_ASAN_SCOPE</code>	Enable AddressSanitizer - fsanitize-address-use-after-scope Clang flag	OFF	5.7.21	
<code>WITH_AUTHENTICATION_LDAP</code>	Whether to report error if LDAP authentication plugins cannot be built	OFF	5.7.19	
<code>WITH_AUTHENTICATION_PAM</code>	Build PAM authentication plugin	OFF		
<code>WITH_AWS_SDK</code>	Location of Amazon Web Services software development kit		5.7.19	
<code>WITH_BOOST</code>	The location of the Boost library sources		5.7.5	
<code>WITH_CLIENT_PROTOCOL_TRACING</code>	Build client-side protocol tracing framework	ON	5.7.2	
<code>WITH_CURL</code>	Location of curl library		5.7.19	
<code>WITH_DEBUG</code>	Whether to include debugging support	OFF		
<code>WITH_DEFAULT_COMPILER_OPTIONS</code>	Whether to use default compiler options	ON		
<code>WITH_DEFAULT_FEATURE_SET</code>	Whether to use default feature set	ON		
<code>WITH_EDITLINE</code>	Which libedit/editline library to use	bundled	5.7.2	
<code>WITH_EMBEDDED_SERVER</code>	Whether to build embedded server	OFF		
<code>WITH_EMBEDDED_SHARED_LIBS</code>	Whether to build a shared embedded server library	OFF	5.7.4	
<code>WITH_EXTRA_CHARSETS</code>	Which extra character sets to include	all		
<code>WITH_GMOCK</code>	Path to googlemock distribution			
<code>WITH_INNOODB_EXTRA_DEBUG</code>	Whether to include extra debugging support for InnoDB.	OFF	5.7.2	
<code>WITH_INNOODB_MEMCACHED</code>	Whether to generate memcached shared libraries.	OFF		
<code>WITH_KEYRING_TEST</code>	Build the keyring test program	OFF	5.7.11	
<code>WITH_LDAP</code>	Internal use only		5.7.29	
<code>WITH_LIBEVENT</code>	Which libevent library to use	bundled		
<code>WITH_LIBWRAP</code>	Whether to include libwrap (TCP wrappers) support	OFF		
<code>WITH_LZ4</code>	Type of LZ4 library support	bundled	5.7.14	
<code>WITH_MECAB</code>	Compiles MeCab		5.7.6	

Formats	Description	Default	Introduced	Removed
WITH_MSAN	Enable MemorySanitizer	OFF	5.7.4	
WITH_MSVCRT_DEBUG	Enable Visual Studio CRT memory leak tracing	OFF	5.7.6	
WITH_NDBCLUSTER	Build the NDB storage engine; alias for WITH_NDBCLUSTER_STORAGE_ENGINE	ON		
WITH_NDBCLUSTER_STORAGE_ENGINE	Build the NDB storage engine	ON		
WITH_NDB_TEST	Include NDB API test programs.	OFF		
WITH_NUMA	Set NUMA memory allocation policy		5.7.17	
WITH_PROTOBUF	Which Protocol Buffers package to use	bundled	5.7.12	
WITH_RAPID	Whether to build rapid development cycle plugins	ON	5.7.12	
WITH_SASL	Internal use only		5.7.29	
WITH_SSL	Type of SSL support	system		
WITH_SYSTEMD	Enable installation of systemd support files	OFF	5.7.6	
WITH_TEST_TRACE_PLUGIN	Build test protocol trace plugin	OFF	5.7.2	
WITH_UBSAN	Enable Undefined Behavior Sanitizer	OFF	5.7.6	
WITH_UNIT_TESTS	Compile MySQL with unit tests	ON		
WITH_UNIXODBC	Enable unixODBC support	OFF		
WITH_VALGRIND	Whether to compile in Valgrind header files	OFF		
WITH_ZLIB	Type of zlib support	bundled		
WITH_xxx_STORAGE_ENGINE	Compile storage engine xxx statically into server			

## General Options

- `-DBUILD_CONFIG=mysql_release`

This option configures a source distribution with the same build options used by Oracle to produce binary distributions for official MySQL releases.

- `-DCMAKE_BUILD_TYPE=type`

The type of build to produce:

- `RelWithDebInfo`: Enable optimizations and generate debugging information. This is the default MySQL build type.

- `Debug`: Disable optimizations and generate debugging information. This build type is also used if the `WITH_DEBUG` option is enabled. That is, `-DWITH_DEBUG=1` has the same effect as `-DCMAKE_BUILD_TYPE=Debug`.

- `-DCPACK_MONOLITHIC_INSTALL=bool`

This option affects whether the `make package` operation produces multiple installation package files or a single file. If disabled, the operation produces multiple installation package files, which may be useful if you want to install only a subset of a full MySQL installation. If enabled, it produces a single file for installing everything.

## Installation Layout Options

The `CMAKE_INSTALL_PREFIX` option indicates the base installation directory. Other options with names of the form `INSTALL_xxx` that indicate component locations are interpreted relative to the prefix and their values are relative pathnames. Their values should not include the prefix.

- `-DCMAKE_INSTALL_PREFIX=dir_name`

The installation base directory.

This value can be set at server startup with the `--basedir` option.

- `-DINSTALL_BINDIR=dir_name`

Where to install user programs.

- `-DINSTALL_DOCDIR=dir_name`

Where to install documentation.

- `-DINSTALL_DOCREADMEDIR=dir_name`

Where to install `README` files.

- `-DINSTALL_INCLUDEDIR=dir_name`

Where to install header files.

- `-DINSTALL_INFODIR=dir_name`

Where to install Info files.

- `-DINSTALL_LAYOUT=name`

Select a predefined installation layout:

- `STANDALONE`: Same layout as used for `.tar.gz` and `.zip` packages. This is the default.
- `RPM`: Layout similar to RPM packages.
- `SVR4`: Solaris package layout.
- `DEB`: DEB package layout (experimental).

You can select a predefined layout but modify individual component installation locations by specifying other options. For example:

```
cmake . -DINSTALL_LAYOUT=SVR4 -DMYSQL_DATADIR=/var/mysql/data
```

The `INSTALL_LAYOUT` value determines the default value of the `secure_file_priv`, `keyring_encrypted_file_data`, and `keyring_file_data` system variables. See the descriptions of those variables in [Server System Variables](#), and [Keyring System Variables](#).

- `-DINSTALL_LIBDIR=dir_name`

Where to install library files.

- `-DINSTALL_MANDIR=dir_name`

Where to install manual pages.

- `-DINSTALL_MYSQLKEYRINGDIR=dir_path`

The default directory to use as the location of the `keyring_file` plugin data file. The default value is platform specific and depends on the value of the `INSTALL_LAYOUT` CMake option; see the description of the `keyring_file_data` system variable in [Server System Variables](#).

This option was added in MySQL 5.7.11.

- `-DINSTALL_MYSQLSHAREDIR=dir_name`

Where to install shared data files.

- `-DINSTALL_MYSQLTESTDIR=dir_name`

Where to install the `mysql-test` directory. To suppress installation of this directory, explicitly set the option to the empty value (`-DINSTALL_MYSQLTESTDIR=`).

- `-DINSTALL_PKGCONFIGDIR=dir_name`

The directory in which to install the `mysqlclient.pc` file for use by `pkg-config`. The default value is `INSTALL_LIBDIR/pkgconfig`, unless `INSTALL_LIBDIR` ends with `/mysql`, in which case that is removed first.

- `-DINSTALL_PLUGINDIR=dir_name`

The location of the plugin directory.

This value can be set at server startup with the `--plugin_dir` option.

- `-DINSTALL_SBINDIR=dir_name`

Where to install the `mysqld` server.

- `-DINSTALL_SCRIPTDIR=dir_name`

Where to install `mysql_install_db`.

- `-DINSTALL_SECURE_FILE_PRIVDIR=dir_name`

The default value for the `secure_file_priv` system variable. The default value is platform specific and depends on the value of the `INSTALL_LAYOUT` CMake option; see the description of the `secure_file_priv` system variable in [Server System Variables](#).

To set the value for the `libmysqld` embedded server, use `INSTALL_SECURE_FILE_PRIV_EMBEDDEDIR`.



- `-DINSTALL_SECURE_FILE_PRIV_EMBEDDEDIR=dir_name`

The default value for the `secure_file_priv` system variable, for the `libmysqld` embedded server.

**Note**

The `libmysqld` embedded server library is deprecated as of MySQL 5.7.19; expect it to be removed in MySQL 8.0.

- `-DINSTALL_SHAREDIR=dir_name`

Where to install `aclocal/mysql.m4`.

- `-DINSTALL_SUPPORTFILESDIR=dir_name`

Where to install extra support files.

- `-DMYSQL_DATADIR=dir_name`

The location of the MySQL data directory.

This value can be set at server startup with the `--datadir` option.

- `-DODBC_INCLUDES=dir_name`

The location of the ODBC includes directory, and may be used while configuring Connector/ODBC.

- `-DODBC_LIB_DIR=dir_name`

The location of the ODBC library directory, and may be used while configuring Connector/ODBC.

- `-DSYSCONFDIR=dir_name`

The default `my.cnf` option file directory.

This location cannot be set at server startup, but you can start the server with a given option file using the `--defaults-file=file_name` option, where `file_name` is the full path name to the file.

- `-DSYSTEMD_PID_DIR=dir_name`

The name of the directory in which to create the PID file when MySQL is managed by systemd. The default is `/var/run/mysqld`; this might be changed implicitly according to the `INSTALL_LAYOUT` value.

This option is ignored unless `WITH_SYSTEMD` is enabled.

- `-DSYSTEMD_SERVICE_NAME=name`

The name of the MySQL service to use when MySQL is managed by systemd. The default is `mysqld`; this might be changed implicitly according to the `INSTALL_LAYOUT` value.

This option is ignored unless `WITH_SYSTEMD` is enabled.

- `-DTMPDIR=dir_name`

The default location to use for the `tmpdir` system variable. If unspecified, the value defaults to `P_tmpdir` in `<stdio.h>`.

## Storage Engine Options

Storage engines are built as plugins. You can build a plugin as a static module (compiled into the server) or a dynamic module (built as a dynamic library that must be installed into the server using the `INSTALL PLUGIN` statement or the `--plugin-load` option before it can be used). Some plugins might not support static or dynamic building.

The `InnoDB`, `MyISAM`, `MERGE`, `MEMORY`, and `CSV` engines are mandatory (always compiled into the server) and need not be installed explicitly.

To compile a storage engine statically into the server, use `-DWITH_engine_STORAGE_ENGINE=1`. Some permissible `engine` values are `ARCHIVE`, `BLACKHOLE`, `EXAMPLE`, `FEDERATED`, `NDB` or `NDBCLUSTER` (`NDB`), and `PARTITION` (partitioning support). Examples:

```
-DWITH_ARCHIVE_STORAGE_ENGINE=1
-DWITH_BLACKHOLE_STORAGE_ENGINE=1
```

### Note

`WITH_NDBCLUSTER_STORAGE_ENGINE` is supported only when building NDB Cluster using the NDB Cluster sources. It cannot be used to enable clustering support in other MySQL source trees or distributions. In NDB Cluster source distributions, it is enabled by default. See [Building NDB Cluster from Source on Linux](#), and [Compiling and Installing NDB Cluster from Source on Windows](#), for more information.

### Note

It is not possible to compile without Performance Schema support. If it is desired to compile without particular types of instrumentation, that can be done with the following `CMake` options:

```
DISABLE_PSI_COND
DISABLE_PSI_FILE
DISABLE_PSI_IDLE
DISABLE_PSI_MEMORY
DISABLE_PSI_METADATA
DISABLE_PSI_MUTEX
DISABLE_PSI_PS
DISABLE_PSI_RWLOCK
DISABLE_PSI_SOCKET
DISABLE_PSI_SP
DISABLE_PSI_STAGE
DISABLE_PSI_STATEMENT
DISABLE_PSI_STATEMENT_DIGEST
DISABLE_PSI_TABLE
DISABLE_PSI_THREAD
DISABLE_PSI_TRANSACTION
```

For example, to compile without mutex instrumentation, configure MySQL using the `-DDISABLE_PSI_MUTEX=1` option.

To exclude a storage engine from the build, use `-DWITH_engine_STORAGE_ENGINE=0`. Examples:

```
-DWITH_EXAMPLE_STORAGE_ENGINE=0
-DWITH_FEDERATED_STORAGE_ENGINE=0
-DWITH_PARTITION_STORAGE_ENGINE=0
```

It is also possible to exclude a storage engine from the build using `-DWITHOUT_engine_STORAGE_ENGINE=1` (but `-DWITH_engine_STORAGE_ENGINE=0` is preferred). Examples:

```
-DWITHOUT_EXAMPLE_STORAGE_ENGINE=1
-DWITHOUT_FEDERATED_STORAGE_ENGINE=1
-DWITHOUT_PARTITION_STORAGE_ENGINE=1
```

If neither `-DWITH_engine_STORAGE_ENGINE` nor `-DWITHOUT_engine_STORAGE_ENGINE` are specified for a given storage engine, the engine is built as a shared module, or excluded if it cannot be built as a shared module.

## Feature Options

- `-DCOMPILATION_COMMENT=string`

A descriptive comment about the compilation environment.

- `-DDEFAULT_CHARSET=charset_name`

The server character set. By default, MySQL uses the `latin1` (cp1252 West European) character set.

`charset_name` may be one of `binary`, `armscii8`, `ascii`, `big5`, `cp1250`, `cp1251`, `cp1256`, `cp1257`, `cp850`, `cp852`, `cp866`, `cp932`, `dec8`, `eucljms`, `euclkr`, `gb2312`, `gbk`, `geostd8`, `greek`, `hebrew`, `hp8`, `keybcs2`, `koi8r`, `koi8u`, `latin1`, `latin2`, `latin5`, `latin7`, `macce`, `macroman`, `sjis`, `swe7`, `tis620`, `ucs2`, `ujis`, `utf8`, `utf8mb4`, `utf16`, `utf16le`, `utf32`. The permissible character sets are listed in the `cmake/character_sets.cmake` file as the value of `CHARSETS_AVAILABLE`.

This value can be set at server startup with the `--character_set_server` option.

- `-DDEFAULT_COLLATION=collation_name`

The server collation. By default, MySQL uses `latin1_swedish_ci`. Use the `SHOW COLLATION` statement to determine which collations are available for each character set.

This value can be set at server startup with the `--collation_server` option.

- `-DDISABLE_PSI_COND=bool`

Whether to exclude the Performance Schema condition instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_FILE=bool`

Whether to exclude the Performance Schema file instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_IDLE=bool`

Whether to exclude the Performance Schema idle instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_MEMORY=bool`

Whether to exclude the Performance Schema memory instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_METADATA=bool`

Whether to exclude the Performance Schema metadata instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_MUTEX=bool`

Whether to exclude the Performance Schema mutex instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_RWLOCK=bool`

Whether to exclude the Performance Schema rlock instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_SOCKET=bool`

Whether to exclude the Performance Schema socket instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_SP=bool`

Whether to exclude the Performance Schema stored program instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_STAGE=bool`

Whether to exclude the Performance Schema stage instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_STATEMENT=bool`

Whether to exclude the Performance Schema statement instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_STATEMENT_DIGEST=bool`

Whether to exclude the Performance Schema statement\_digest instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_TABLE=bool`

Whether to exclude the Performance Schema table instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_PS=bool`

Exclude the performance schema prepared statements instances instrumentation. The default is `OFF` (include).

- `-DDISABLE_PSI_THREAD=bool`

Exclude the performance schema thread instrumentation. The default is `OFF` (include).

Only disable threads when building without any instrumentation, because other instrumentations have a dependency on threads.

- `-DDISABLE_PSI_TRANSACTION=bool`

Exclude the performance schema transaction instrumentation. The default is `OFF` (include).

- `-DDOWNLOAD_BOOST=bool`

Whether to download the Boost library. The default is `OFF`.

See the `WITH_BOOST` option for additional discussion about using Boost.

- `-DDOWNLOAD_BOOST_TIMEOUT=seconds`

The timeout in seconds for downloading the Boost library. The default is 600 seconds.

See the `WITH_BOOST` option for additional discussion about using Boost.

- `-DENABLE_DOWNLOADS=bool`

Whether to download optional files. For example, with this option enabled, `CMake` downloads the Google Test distribution that is used by the test suite to run unit tests.

- `-DENABLE_DTRACE=bool`

Whether to include support for DTrace probes. For information about DTrace, see [Tracing mysqld Using DTrace](#)

This option is deprecated because support for DTrace is deprecated in MySQL 5.7 and is removed in MySQL 8.0.

- `-DENABLE_GCOV=bool`

Whether to include gcov support (Linux only).

- `-DENABLE_GPROF=bool`

Whether to enable `gprof` (optimized Linux builds only).

- `-DISABLED_LOCAL_INFFILE=bool`

This option controls the compiled-in default `LOCAL` capability for the MySQL client library. Clients that make no explicit arrangements therefore have `LOCAL` capability disabled or enabled according to the `ENABLED_LOCAL_INFFILE` setting specified at MySQL build time.

By default, the client library in MySQL binary distributions is compiled with `ENABLED_LOCAL_INFFILE` enabled. If you compile MySQL from source, configure it with `ENABLED_LOCAL_INFFILE` disabled or enabled based on whether clients that make no explicit arrangements should have `LOCAL` capability disabled or enabled, respectively.

`ENABLED_LOCAL_INFFILE` controls the default for client-side `LOCAL` capability. For the server, the `local_infile` system variable controls server-side `LOCAL` capability. To explicitly cause the server to refuse or permit `LOAD DATA LOCAL` statements (regardless of how client programs and libraries are configured at build time or runtime), start `mysqld` with `local_infile` disabled or enabled, respectively. `local_infile` can also be set at runtime. See [Security Considerations for LOAD DATA LOCAL](#).

- `-DISABLED_PROFILING=bool`

Whether to enable query profiling code (for the `SHOW PROFILE` and `SHOW PROFILES` statements).

- `-DFORCE_UNSUPPORTED_COMPILER=bool`

By default, `CMake` checks for minimum versions of supported compilers: Visual Studio 2013 (Windows); GCC 4.4 or Clang 3.3 (Linux); Developer Studio 12.5 (Solaris server); Developer Studio 12.2 or GCC 4.4 (Solaris client library); Clang 3.3 (macOS), Clang 3.3 (FreeBSD). To disable this check, use `-DFORCE_UNSUPPORTED_COMPILER=ON`.

- `-DIGNORE_AIO_CHECK=bool`

If the `-DBUILD_CONFIG=mysql_release` option is given on Linux, the `libaio` library must be linked in by default. If you do not have `libaio` or do not want to install it, you can suppress the check for it by specifying `-DIGNORE_AIO_CHECK=1`.

- `-DMAX_INDEXES=num`

The maximum number of indexes per table. The default is 64. The maximum is 255. Values smaller than 64 are ignored and the default of 64 is used.

- `-DMYSQL_MAINTAINER_MODE=bool`

Whether to enable a MySQL maintainer-specific development environment. If enabled, this option causes compiler warnings to become errors.

- `-DMUTEX_TYPE=type`

The mutex type used by InnoDB. Options include:

- `event`: Use event mutexes. This is the default value and the original InnoDB mutex implementation.
- `sys`: Use POSIX mutexes on UNIX systems. Use `CRITICAL_SECTION` objects on Windows, if available.
- `futex`: Use Linux futexes instead of condition variables to schedule waiting threads.

- `-DMYSQLX_TCP_PORT=port_num`

The port number on which X Plugin listens for TCP/IP connections. The default is 33060.

This value can be set at server startup with the `mysqlx_port` system variable.

- `-DMYSQLX_UNIX_ADDR=file_name`

The Unix socket file path on which the server listens for X Plugin socket connections. This must be an absolute path name. The default is `/tmp/mysqlx.sock`.

This value can be set at server startup with the `mysqlx_port` system variable.

- `-DMYSQL_PROJECT_NAME=name`

For Windows or macOS, the project name to incorporate into the project file name.

- `-DMYSQL_TCP_PORT=port_num`

The port number on which the server listens for TCP/IP connections. The default is 3306.

This value can be set at server startup with the `--port` option.

- `-DMYSQL_UNIX_ADDR=file_name`

The Unix socket file path on which the server listens for socket connections. This must be an absolute path name. The default is `/tmp/mysql.sock`.

This value can be set at server startup with the `--socket` option.

- `-DOPTIMIZER_TRACE=bool`

Whether to support optimizer tracing. See [MySQL Internals: Tracing the Optimizer](#).

- `-DREPRODUCIBLE_BUILD=bool`

For builds on Linux systems, this option controls whether to take extra care to create a build result independent of build location and time.

This option was added in MySQL 5.7.19.

- `-DWIN_DEBUG_NO_INLINE=bool`

Whether to disable function inlining on Windows. The default is off (inlining enabled).

- `-DWITH_ASAN=bool`

Whether to enable the AddressSanitizer, for compilers that support it. The default is off.

- `-DWITH_ASAN_SCOPE=bool`

Whether to enable the AddressSanitizer `-fsanitize-address-use-after-scope` Clang flag for use-after-scope detection. The default is off. To use this option, `-DWITH_ASAN` must also be enabled.

- `-DWITH_AUTHENTICATION_LDAP=bool`

Whether to report an error if the LDAP authentication plugins cannot be built:

- If this option is disabled (the default), the LDAP plugins are built if the required header files and libraries are found. If they are not, `CMake` displays a note about it.
- If this option is enabled, a failure to find the required header file and libraries causes `CMake` to produce an error, preventing the server from being built.

For information about LDAP authentication, see [LDAP Pluggable Authentication](#). This option was added in MySQL 5.7.19.

- `-DWITH_AUTHENTICATION_PAM=bool`

Whether to build the PAM authentication plugin, for source trees that include this plugin. (See [PAM Pluggable Authentication](#).) If this option is specified and the plugin cannot be compiled, the build fails.

- `-DWITH_AWS_SDK=path_name`

The location of the Amazon Web Services software development kit.

This option was added in MySQL 5.7.19.

- `-DWITH_BOOST=`*path\_name*

The Boost library is required to build MySQL. These CMake options enable control over the library source location, and whether to download it automatically:

- `-DWITH_BOOST=`*path\_name* specifies the Boost library directory location. It is also possible to specify the Boost location by setting the `BOOST_ROOT` or `WITH_BOOST` environment variable.

As of MySQL 5.7.11, `-DWITH_BOOST=`*system* is permitted and indicates that the correct version of Boost is installed on the compilation host in the standard location. In this case, the installed version of Boost is used rather than any version included with a MySQL source distribution.

- `-DDOWNLOAD_BOOST=`*bool* specifies whether to download the Boost source if it is not present in the specified location. The default is `OFF`.
- `-DDOWNLOAD_BOOST_TIMEOUT=`*seconds* the timeout in seconds for downloading the Boost library. The default is 600 seconds.

For example, if you normally build MySQL placing the object output in the `bld` subdirectory of your MySQL source tree, you can build with Boost like this:

```
mkdir bld
cd bld
cmake .. -DDOWNLOAD_BOOST=ON -DWITH_BOOST=$HOME/my_boost
```

This causes Boost to be downloaded into the `my_boost` directory under your home directory. If the required Boost version is already there, no download is done. If the required Boost version changes, the newer version is downloaded.

If Boost is already installed locally and your compiler finds the Boost header files on its own, it may not be necessary to specify the preceding CMake options. However, if the version of Boost required by MySQL changes and the locally installed version has not been upgraded, you may have build problems. Using the CMake options should give you a successful build.

With the above settings that allow Boost download into a specified location, when the required Boost version changes, you need to remove the `bld` folder, recreate it, and perform the `cmake` step again. Otherwise, the new Boost version might not get downloaded, and compilation might fail.

- `-DWITH_CLIENT_PROTOCOL_TRACING=`*bool*

Whether to build the client-side protocol tracing framework into the client library. By default, this option is enabled.

For information about writing protocol trace client plugins, see [Writing Protocol Trace Plugins](#).

See also the `WITH_TEST_TRACE_PLUGIN` option.

- `-DWITH_CURL=`*curl\_type*

The location of the `curl` library. `curl_type` can be `system` (use the system `curl` library) or a path name to the `curl` library.

This option was added in MySQL 5.7.19.



- `-DWITH_DEBUG=bool`

Whether to include debugging support.

Configuring 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.

Sync debug checking for the `InnoDB` storage engine is defined under `UNIV_DEBUG` and is available when debugging support is compiled in using the `WITH_DEBUG` option. When debugging support is compiled in, the `innodb_sync_debug` configuration option can be used to enable or disable `InnoDB` sync debug checking.

As of MySQL 5.7.18, enabling `WITH_DEBUG` also enables Debug Sync. For a description of the Debug Sync facility and how to use synchronization points, see [MySQL Internals: Test Synchronization](#).

- `-DWITH_DEFAULT_FEATURE_SET=bool`

Whether to use the flags from `cmake/build_configurations/feature_set.cmake`.

- `-DWITH_EDITLINE=value`

Which `libedit/editline` library to use. The permitted values are `bundled` (the default) and `system`. `WITH_EDITLINE` replaces `WITH_LIBEDIT`, which has been removed.

- `-DWITH_EMBEDDED_SERVER=bool`

Whether to build the `libmysqld` embedded server library.

**Note**

The `libmysqld` embedded server library is deprecated as of MySQL 5.7.17 and has been removed in MySQL 8.0.

- `-DWITH_EMBEDDED_SHARED_LIBRARY=bool`

Whether to build a shared `libmysqld` embedded server library.

**Note**

The `libmysqld` embedded server library is deprecated as of MySQL 5.7.17 and has been removed in MySQL 8.0.

- `-DWITH_EXTRA_CHARSETS=name`

Which extra character sets to include:

- `all`: All character sets. This is the default.
- `complex`: Complex character sets.
- `none`: No extra character sets.

- `-DWITH_GMOCK=path_name`

The path to the `googlemock` distribution, for use with Google Test-based unit tests. The option value is the path to the distribution Zip file. Alternatively, set the `WITH_GMOCK` environment variable to the

path name. It is also possible to use `-DENABLE_DOWNLOADS=1`, in which case `CMake` downloads the distribution from GitHub.

If you build MySQL without the Google Test-based unit tests (by configuring without `WITH_GMOCK`), `CMake` displays a message indicating how to download it.

- `-DWITH_INNODB_EXTRA_DEBUG=bool`

Whether to include extra InnoDB debugging support.

Enabling `WITH_INNODB_EXTRA_DEBUG` turns on extra InnoDB debug checks. This option can only be enabled when `WITH_DEBUG` is enabled.

- `-DWITH_INNODB_MEMCACHED=bool`

Whether to generate memcached shared libraries (`libmemcached.so` and `innodb_engine.so`).

- `-DWITH_KEYRING_TEST=bool`

Whether to build the test program that accompanies the `keyring_file` plugin. The default is `OFF`. Test file source code is located in the `plugin/keyring/keyring-test` directory.

This option was added in MySQL 5.7.11.

- `-DWITH_LDAP=value`

Internal use only. This option was added in MySQL 5.7.29.

- `-DWITH_LIBEVENT=string`

Which `libevent` library to use. Permitted values are `bundled` (default) and `system`. Prior to MySQL 5.7.31, if you specify `system`, the system `libevent` library is used if present, and an error occurs otherwise. In MySQL 5.7.31 and later, if `system` is specified and no system `libevent` library can be found, an error occurs regardless, and the bundled `libevent` is not used.

The `libevent` library is required by InnoDB memcached and X Plugin.

- `-DWITH_LIBWRAP=bool`

Whether to include `libwrap` (TCP wrappers) support.

- `-DWITH_LZ4=lz4_type`

The `WITH_LZ4` indicates the source of `zlib` support:

- `bundled`: Use the `LZ4` library bundled with the distribution. This is the default.
- `system`: Use the system `LZ4` library. If `WITH_LZ4` is set to this value, the `lz4_decompress` utility is not built. In this case, the system `lz4` command can be used instead.
- `-DWITH_MECAB={disabled|system|path_name}`

Use this option to compile the MeCab parser. If you have installed MeCab to its default installation directory, set `-DWITH_MECAB=system`. The `system` option applies to MeCab installations performed from source or from binaries using a native package management utility. If you installed MeCab to a custom installation directory, specify the path to the MeCab installation. For example, `-DWITH_MECAB=/opt/mecab`. If the `system` option does not work, specifying the MeCab installation path should work in all cases.

For related information, see [MeCab Full-Text Parser Plugin](#).

- `-DWITH_MSAN=bool`

Whether to enable MemorySanitizer, for compilers that support it. The default is off.

For this option to have an effect if enabled, all libraries linked to MySQL must also have been compiled with the option enabled.

- `-DWITH_MSVCRT_DEBUG=bool`

Whether to enable Visual Studio CRT memory leak tracing. The default is `OFF`.

- `-DWITH_NUMA=bool`

Explicitly set the NUMA memory allocation policy. `CMake` sets the default `WITH_NUMA` value based on whether the current platform has NUMA support. For platforms without NUMA support, `CMake` behaves as follows:

- With no NUMA option (the normal case), `CMake` continues normally, producing only this warning: NUMA library missing or required version not available
- With `-DWITH_NUMA=ON`, `CMake` aborts with this error: NUMA library missing or required version not available

This option was added in MySQL 5.7.17.

- `-DWITH_PROTOBUF=protobuf_type`

Which Protocol Buffers package to use. `protobuf_type` can be one of the following values:

- `bundled`: Use the package bundled with the distribution. This is the default.
- `system`: Use the package installed on the system.

Other values are ignored, with a fallback to `bundled`.

This option was added in MySQL 5.7.12.

- `-DWITH_RAPID=bool`

Whether to build the rapid development cycle plugins. When enabled, a `rapid` directory is created in the build tree containing these plugins. When disabled, no `rapid` directory is created in the build tree. The default is `ON`, unless the `rapid` directory is removed from the source tree, in which case the default becomes `OFF`. This option was added in MySQL 5.7.12.

- `-DWITH_SASL=value`

Internal use only. This option was added in MySQL 5.7.29.

- `-DWITH_SSL={ssl_type|path_name}`

For support of encrypted connections, entropy for random number generation, and other encryption-related operations, MySQL must be built using an SSL library. This option specifies which SSL library to use.

- `ssl_type` can be one of the following values:

- `yes`: Use the system OpenSSL library if present, else the library bundled with the distribution.
- `bundled`: Use the SSL library bundled with the distribution. This is the default prior to MySQL 5.7.28. As of 5.7.28, this is no longer a permitted value and the default is `system`.
- `system`: Use the system OpenSSL library. This is the default as of MySQL 5.7.28.
- `path_name` is the path name to the OpenSSL installation to use. This can be preferable to using the `ssl_type` value of `system` because it can prevent CMake from detecting and using an older or incorrect OpenSSL version installed on the system. (Another permitted way to do the same thing is to set `WITH_SSL` to `system` and set the `CMAKE_PREFIX_PATH` option to `path_name`.)

For additional information about configuring the SSL library, see [Configuring SSL Library Support](#).

- `-DWITH_SYSTEMD=bool`

Whether to enable installation of systemd support files. By default, this option is disabled. When enabled, systemd support files are installed, and scripts such as `mysqld_safe` and the System V initialization script are not installed. On platforms where systemd is not available, enabling `WITH_SYSTEMD` results in an error from CMake.

For more information about using systemd, see [Managing MySQL Server with systemd](#). That section also includes information about specifying options previously specified in `[mysqld_safe]` option groups. Because `mysqld_safe` is not installed when systemd is used, such options must be specified another way.

- `-DWITH_TEST_TRACE_PLUGIN=bool`

Whether to build the test protocol trace client plugin (see [Using the Test Protocol Trace Plugin](#)). By default, this option is disabled. Enabling this option has no effect unless the `WITH_CLIENT_PROTOCOL_TRACING` option is enabled. If MySQL is configured with both options enabled, the `libmysqlclient` client library is built with the test protocol trace plugin built in, and all the standard MySQL clients load the plugin. However, even when the test plugin is enabled, it has no effect by default. Control over the plugin is afforded using environment variables; see [Using the Test Protocol Trace Plugin](#).

#### Note

Do *not* enable the `WITH_TEST_TRACE_PLUGIN` option if you want to use your own protocol trace plugins because only one such plugin can be loaded at a time and an error occurs for attempts to load a second one. If you have already built MySQL with the test protocol trace plugin enabled to see how it works, you must rebuild MySQL without it before you can use your own plugins.

For information about writing trace plugins, see [Writing Protocol Trace Plugins](#).

- `-DWITH_UBSAN=bool`

Whether to enable the Undefined Behavior Sanitizer, for compilers that support it. The default is off.

- `-DWITH_UNIT_TESTS={ON|OFF}`

If enabled, compile MySQL with unit tests. The default is ON unless the server is not being compiled.

- `-DWITH_UNIXODBC=1`

Enables unixODBC support, for Connector/ODBC.

- `-DWITH_VALGRIND=bool`

Whether to compile in the Valgrind header files, which exposes the Valgrind API to MySQL code. The default is `OFF`.

To generate a Valgrind-aware debug build, `-DWITH_VALGRIND=1` normally is combined with `-DWITH_DEBUG=1`. See [Building Debug Configurations](#).

- `-DWITH_ZLIB=zlib_type`

Some features require that the server be built with compression library support, such as the `COMPRESS()` and `UNCOMPRESS()` functions, and compression of the client/server protocol. The `WITH_ZLIB` indicates the source of `zlib` support:

- `bundled`: Use the `zlib` library bundled with the distribution. This is the default.
- `system`: Use the system `zlib` library.

## Compiler Flags

- `-DCMAKE_C_FLAGS="flags"`

Flags for the C Compiler.

- `-DCMAKE_CXX_FLAGS="flags"`

Flags for the C++ Compiler.

- `-DWITH_DEFAULT_COMPILER_OPTIONS=bool`

Whether to use the flags from `cmake/build_configurations/compiler_options.cmake`.

### Note

All optimization flags were carefully chosen and tested by the MySQL build team. Overriding them can lead to unexpected results and is done at your own risk.

- `-DSUNPRO_CXX_LIBRARY="lib_name"`

Enable linking against `libCstd` instead of `stlport4` on Solaris 10 or later. This works only for client code because the server depends on C++98.

To specify your own C and C++ compiler flags, for flags that do not affect optimization, use the `CMAKE_C_FLAGS` and `CMAKE_CXX_FLAGS` CMake options.

When providing your own compiler flags, you might want to specify `CMAKE_BUILD_TYPE` as well.

For example, to create a 32-bit release build on a 64-bit Linux machine, do this:

```
mkdir bld
cd bld
cmake .. -DCMAKE_C_FLAGS=-m32 \
        -DCMAKE_CXX_FLAGS=-m32 \
        -DCMAKE_BUILD_TYPE=RelWithDebInfo
```

If you set flags that affect optimization (`-Onumber`), you must set the `CMAKE_C_FLAGS_build_type` and/or `CMAKE_CXX_FLAGS_build_type` options, where `build_type` corresponds to the `CMAKE_BUILD_TYPE` value. To specify a different optimization for the default

build type (`RelWithDebInfo`) set the `CMAKE_C_FLAGS_RELWITHDEBINFO` and `CMAKE_CXX_FLAGS_RELWITHDEBINFO` options. For example, to compile on Linux with `-O3` and with debug symbols, do this:

```
cmake .. -DCMAKE_C_FLAGS_RELWITHDEBINFO="-O3 -g" \
        -DCMAKE_CXX_FLAGS_RELWITHDEBINFO="-O3 -g"
```

## CMake Options for Compiling NDB Cluster

The following options are for use when building NDB Cluster with the NDB Cluster sources; they are not currently supported when using sources from the MySQL 5.6 Server tree.

- `-DMEMCACHED_HOME=dir_name`

Perform the build using the memcached (version 1.6 or later) installed in the system directory indicated by `dir_name`. Files from this installation that are used in the build include the memcached binary, header files, and libraries, as well as the `memcached_utilities` library and the header file `engine_testapp.h`.

You must leave this option unset when building `ndbmemcache` using the bundled memcached sources (`WITH_BUNDLED_MEMCACHED` option); in other words, the bundled sources are used by default).

While additional CMake options—such as for SASL authorization and for providing `dtrace` support—are available for use when compiling `memcached` from external sources, these options are currently not enabled for the `memcached` sources bundled with NDB Cluster.

- `-DWITH_BUNDLED_LIBEVENT={ON|OFF}`

Use the `libevent` included in the NDB Cluster sources when building NDB Cluster with `ndbmemcached` support. Enabled by default. `OFF` causes the system's `libevent` to be used instead.

- `-DWITH_BUNDLED_MEMCACHED={ON|OFF}`

Build the memcached sources included in the NDB Cluster source tree, then use the resulting memcached server when building the `ndbmemcache` engine. In this case, `make install` places the `memcached` binary in the installation `bin` directory, and the `ndbmemcache` engine shared library file `ndb_engine.so` in the installation `lib` directory.

This option is ON by default.

- `-DWITH_CLASSPATH=path`

Sets the classpath for building NDB Cluster Connector for Java. The default is empty. This option is ignored if `-DWITH_NDB_JAVA=OFF` is used.

- `-DWITH_ERROR_INSERT={ON|OFF}`

Enables error injection in the NDB kernel. For testing only; not intended for use in building production binaries. The default is `OFF`.

- `-DWITH_NDBCLUSTER_STORAGE_ENGINE={ON|OFF}`

Build and link in support for the NDB (NDBCLUSTER) storage engine in `mysqld`. The default is `ON`.

- `-DWITH_NDBCLUSTER={ON|OFF}`

This is an alias for `WITH_NDBCLUSTER_STORAGE_ENGINE`.

- `-DWITH_NDBMTD={ON|OFF}`

Build the multithreaded data node executable `ndbmt.d`. The default is `ON`.

- `-DWITH_NDB_BINLOG={ON|OFF}`

Enable binary logging by default in the `mysqld` built using this option. `ON` by default.

- `-DWITH_NDB_DEBUG={ON|OFF}`

Enable building the debug versions of the NDB Cluster binaries. `OFF` by default.

- `-DWITH_NDB_JAVA={ON|OFF}`

Enable building NDB Cluster with Java support, including `ClusterJ`.

This option is `ON` by default. If you do not wish to compile NDB Cluster with Java support, you must disable it explicitly by specifying `-DWITH_NDB_JAVA=OFF` when running `CMake`. Otherwise, if Java cannot be found, configuration of the build fails.

- `-DWITH_NDB_PORT=port`

Causes the NDB Cluster management server (`ndb_mgmd`) that is built to use this `port` by default. If this option is unset, the resulting management server tries to use port 1186 by default.

- `-DWITH_NDB_TEST={ON|OFF}`

If enabled, include a set of NDB API test programs. The default is `OFF`.





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## Chapter 5 Dealing with Problems Compiling MySQL

The solution to many problems involves reconfiguring. If you do reconfigure, take note of the following:

- If `CMake` is run after it has previously been run, it may use information that was gathered during its previous invocation. This information is stored in `CMakeCache.txt`. When `CMake` starts, it looks for that file and reads its contents if it exists, on the assumption that the information is still correct. That assumption is invalid when you reconfigure.
- Each time you run `CMake`, you must run `make` again to recompile. However, you may want to remove old object files from previous builds first because they were compiled using different configuration options.

To prevent old object files or configuration information from being used, run the following commands before re-running `CMake`:

On Unix:

```
shell> make clean
shell> rm CMakeCache.txt
```

On Windows:

```
shell> devenv MySQL.sln /clean
shell> del CMakeCache.txt
```

If you build outside of the source tree, remove and recreate your build directory before re-running `CMake`. For instructions on building outside of the source tree, see [How to Build MySQL Server with CMake](#).

On some systems, warnings may occur due to differences in system include files. The following list describes other problems that have been found to occur most often when compiling MySQL:

- To define which C and C++ compilers to use, you can define the `CC` and `CXX` environment variables. For example:

```
shell> CC=gcc
shell> CXX=g++
shell> export CC CXX
```

To specify your own C and C++ compiler flags, use the `CMAKE_C_FLAGS` and `CMAKE_CXX_FLAGS` `CMake` options. See [Compiler Flags](#).

To see what flags you might need to specify, invoke `mysql_config` with the `--cflags` and `--cxxflags` options.

- To see what commands are executed during the compile stage, after using `CMake` to configure MySQL, run `make VERBOSE=1` rather than just `make`.
- If compilation fails, check whether the `MYSQL_MAINTAINER_MODE` option is enabled. This mode causes compiler warnings to become errors, so disabling it may enable compilation to proceed.
- If your compile fails with errors such as any of the following, you must upgrade your version of `make` to GNU `make`:

```
make: Fatal error in reader: Makefile, line 18:
Badly formed macro assignment
```

Or:

```
make: file `Makefile' line 18: Must be a separator (:
```

---

Or:

```
pthread.h: No such file or directory
```

Solaris and FreeBSD are known to have troublesome `make` programs.

GNU `make` 3.75 is known to work.

- The `sql_yacc.cc` file is generated from `sql_yacc.yy`. Normally, the build process does not need to create `sql_yacc.cc` because MySQL comes with a pregenerated copy. However, if you do need to re-create it, you might encounter this error:

```
"sql_yacc.yy", line xxx fatal: default action causes potential...
```

This is a sign that your version of `yacc` is deficient. You probably need to install a recent version of `bison` (the GNU version of `yacc`) and use that instead.

Versions of `bison` older than 1.75 may report this error:

```
sql_yacc.yy:#####: fatal error: maximum table size (32767) exceeded
```

The maximum table size is not actually exceeded; the error is caused by bugs in older versions of `bison`.

For information about acquiring or updating tools, see the system requirements in [Chapter 1, \*Installing MySQL from Source\*](#).