
# MariaDB : About MariaDB

Jong Jin Lee
SYS4U I&C EC Solution Lab / Software Engineer

# Agenda

- MariaDB ?
- Install MariaDB
- Starting MariaDB & Query Execution

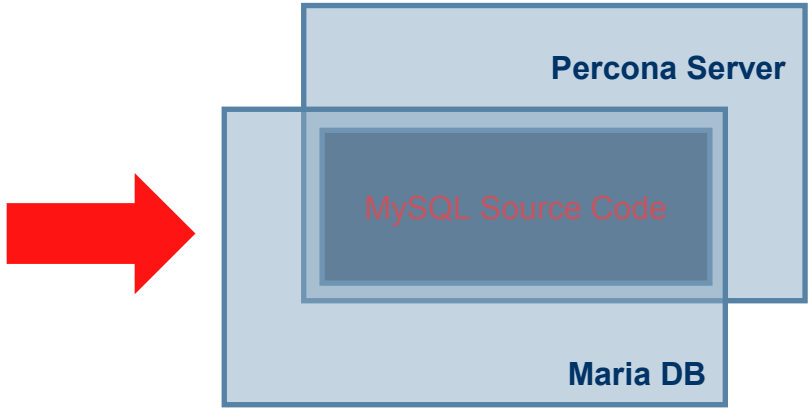
# MariaDB : Feature

## Free & Open Software

- Open source Software
- Developer Based on MySQL Community Version
- Patches, Bug fixes and Feature enhancements (MySQL Community + Monty Program AB)
- Development, Roadmap, Release Cycle and Other issues are Open for community User

## Feature enhanced

- New Storage Engine (PBXT, XtraDB, Maria, FederatedX)
- Virtual Columns
- Services for Plugins
- Optimization
- Enhancement roadmap is publicly available on the wiki
- Backward Compatible
- Percona Server (Developer Based on MySQL Server, Onther MySQL Fork Version)



# MariaDB : Licensing Comparison

ORACLE

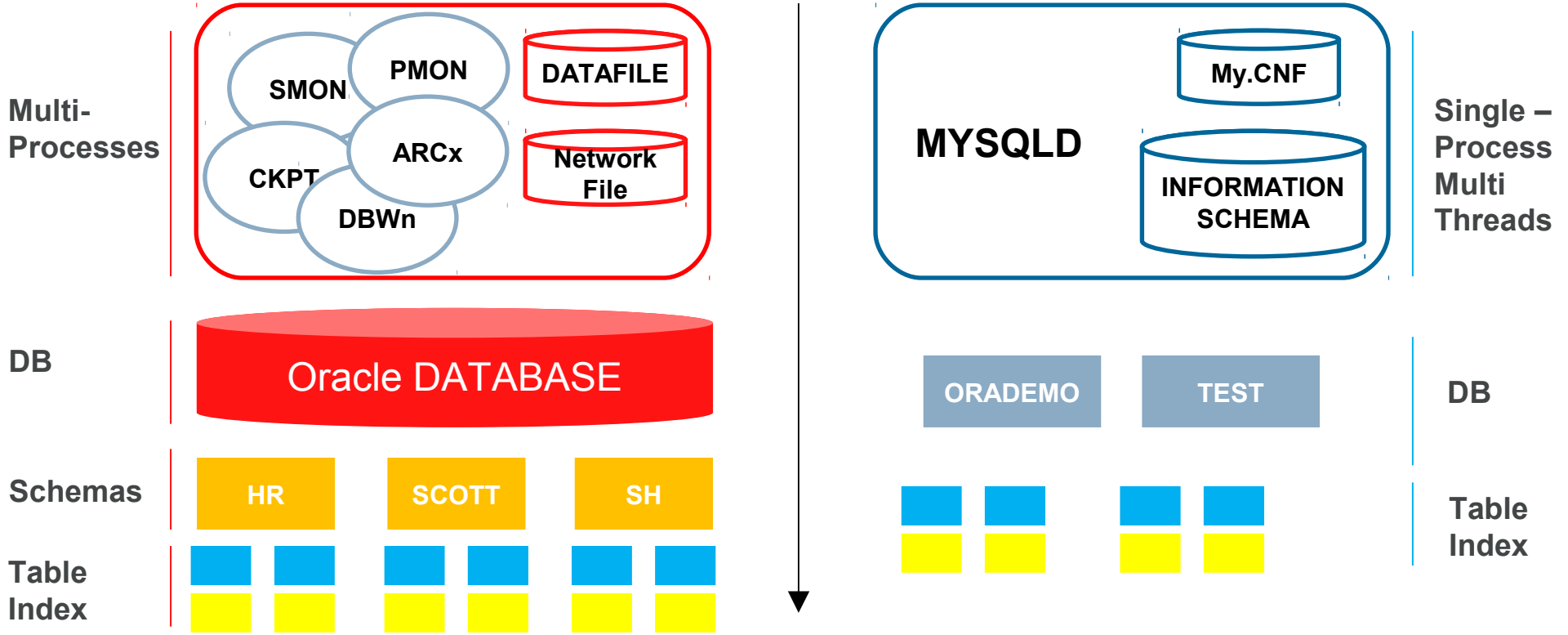
- Commercially licensed
- Companies choose between Named User and Per Processor pricing models
- Standard vs. Enterprise vs. Personal vs. StandardOne
- Per Processor model has multi-core implications

MySQL

- Dual licensed:
  - GNU General Public License (“GPL”)
  - Commercial License
- MySQL in enterprise use:
  - Annual Subscription: per server
- MySQL in embedded use:
  - License - per server
  - Annual Support - per server
- MySQL Cluster CGE:
  - Annual Subscription
  - License + Annual Support


- MariaDB Server
  - GNU General Public License (“GPL”)
- Client Program / Library
  - GUN Lesser General Public License (“LGPL”)
- Community Vesion
  - GNU General Public License (“GPL”)

# MariaDB : Processes and Threads



# MariaDB : Memory and Files

| | Oracle | MySQL |
|---|---|---|
| Memory cache | •PGA (per server process) | |
| | •Hash area | •Join Buffer (per client session) |
| | •Sort area | •Sort Buffer (per client session) |
| | •Stack area | •stack (per client session) |
| | •SGA | |
| | •Shared pool | •(Query Cache) |
| | •DB buffer cache | •Key Buffer [MyISAM]<br>•InnoDB Buffer Cache [InnoDB] |
| | •REDO log buffer | •InnoDB Log Buffer [InnoDB] |
| Files | •init.ora | •my.cnf / my.ini |
| | •System tablespace file | •`mysql` directory |
| | •User tablespace files | •directories in `data` directory<br>•InnoDB tablespace files [InnoDB] |

# MariaDB : Redo & Undo Logs

| | Oracle | MySQL |
|---|---|---|
| REDO/UNDO Logs | •REDO logs | •InnoDB logs [InnoDB]<br>•Binary log |
| | •Archive logs | •Binary log |
| | •UNDO tablespace files | •InnoDB tablespace files [InnoDB] |

# MariaDB : Security

| Security Item | Oracle | MySQL |
|---|---|---|
| Built-in Accounts | SYS, SYSTEM, others | Root. |
| Object Privileges Handled | GRANT, REVOKE | GRANT, REVOKE. Host consideration |
| Privilege Granularity | Column, Row | Column (row via view) |
| Group Management | ROLES | On Roadmap |
| SSL Supported | Yes | Yes |
| Encryption | Transparent, RC4, DES, AES, etc. | AES, DES, MD5 SHA1; 128/256 |
| Auditing | Audit subsystem | Handled via logging |

# MariaDB : Data Types

| Oracle Datatype | MySQL Datatype |
|---|---|
| CHAR, VARCHAR(2), NCHAR, NVARCHAR | CHAR, VARCHAR, TEXT |
| CLOB, LONG | LONGTEXT |
| RAW | MEDIUMBLOB |
| LONG RAW, BLOB | BLOB |
| BFILE | None |

| Oracle Datatype | MySQL Datatype |
|---|---|
| NUMBER, DECIMAL | INT, BIGINT, DECIMAL |
| NUMBER (P,S), DECIMAL (P,S) | DECIMAL (P,S) |
| REAL, DOUBLE | DECIMAL |
| FLOAT | DOUBLE |
| DATE, TIMESTAMP | DATETIME,TIMESTAMP |

# MariaDB : Storage Engine

| Purpose | MariaDB | MySQL |
|---|---|---|
| Memory Engine | Memory | Memory |
| Based on Disk : Temp Table Engine | Aria | MyISAM |
| Transaction Engine | XtraDB | InnoDB |
| NOSQL Support Engine | MariaDB 10.0 Over :Cassandra | Memcached API (Plug-in) |

# MariaDB : Comparison

| | MariaDB | MySQL |
|---|---|---|
| Thread Pool | MariaDB 5.1 Over | MySQL 5.5 Enterprise (Not Support Community Vesion) |
| Buffer Pool | MariaDB 5.5 Over : XtraDB | MySQL 5.6 Over : InnoDB |
| Support SSD (Solid-state Drive) | MariaDB 5.5 Over : XtraDB | |
| Virtual Columns | MariaDB 5.2 Over | |
| Role Management | MariaDB 10.0 Over | |

# MariaDB : Version-specific compatibility

| MariaDB | MySQL |
| --- | --- |
| 5.1, 5.2, 5.3 | 5.1 |
| 5.5, 10.0 | 5.5 |

# MariaDB : Installation Step

```
[root@sys4u ~]# groupadd -g 600 dba
[root@sys4u ~]# useradd -g 600 -u 605 mysql
[root@sys4u ~]# usermod -g 600 mysql
[root@sys4u ~]# usermod -u 605 mysql
[root@sys4u ~]# passwd mysql
Changing password for user mysql.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.

# vi /etc/security/limits.conf
# Below the line
mysql            soft    nproc          8192
mysql            hard    nproc         16384
mysql            soft    nofile          8192
mysql            hard    nofile         65536

# vi /etc/pam.d/login
# Below the line
session    required     pam_limits.so

# vi /etc/profile
# Below the line

if [ $USER = "mysql" ]; then
if [ $SHELL = "/bin/ksh" ]; then
ulimit -p 16384
ulimit -n 65536
else
ulimit -u 16384 -n 65536
fi
```

# MariaDB : Installation Step

```
[root@sys4u ~]# mkdir -p /home/mariadb
[root@sys4u ~]# mkdir -p /home/data/mariadb-data
[root@sys4u ~]# mkdir -p /home/data/mariadb-tmp
[root@sys4u ~]# mkdir -p /home/data/mariadb-iblog
[root@sys4u ~]# mkdir -p /home/data/mariadb-binlog
[root@sys4u ~]# chown -R mysql:dba /home/mariadb/
[root@sys4u ~]# chown -R mysql:dba /home/data/*

[root@sys4u mariadb]# ls
cmake-2.8.4.tar.gz  mariadb-5.5.30.tar.gz
[root@sys4u mariadb]# tar -xvf cmake-2.8.4
[root@sys4u mariadb]# ls
cmake-2.8.4  cmake-2.8.4.tar.gz  mariadb-5.5.30.tar.gz
[root@sys4u mariadb]# cd cmake-2.8.4
[root@sys4u cmake-2.8.4]# ls
CMakeCPack.cmake           ChangeLog.txt       Source
CMakeCPackOptions.cmake.in  CompileFlags.cmake  Templates
CMakeGraphVizOptions.cmake  Copyright.txt       Tests
CMakeLists.txt             DartConfig.cmake    Utilities
CMakeLogo.gif              DartLocal.conf.in   bootstrap
CTestConfig.cmake          Docs                cmake.1
CTestCustom.cmake.in       Example             cmake_uninstall.cmake.in
CTestCustom.ctest.in       Modules             configure
ChangeLog.manual           Readme.txt          doxygen.config
[root@sys4u cmake-2.8.4]# ./bootstrap
-------------------------------------------
-----
-----
-------------------------------------------
Log of errors: /home/mariadb/cmake-2.8.4/Bootstrap.cmk/cmake_bootstrap.log
-------------------------------------------
```

# MariaDB : Installation Step

```
 [root@sys4u cmake-2.8.4]# yum -y install gcc-c++
-----
Loaded plugins: fastestmirror, security
base                                                     | 3.7 kB     00:00
base/primary_db                                          | 4.4 MB     00:00
extras                                                   | 3.4 kB     00:00
extras/primary_db                                        |  19 kB     00:00
updates                                                  | 3.4 kB     00:00
updates/primary_db                                       | 3.2 MB     00:00
Setting up Install Process
Resolving Dependencies
--> Running transaction check
-----
[root@sys4u cmake-2.8.4]# ./bootstrap
-----
Makefile processor on this system is: gmake
g++ is GNU compiler
g++ has STL in std:: namespace
g++ has ANSI streams
g++ has streams in std:: namespace
g++ has sstream
g++ has operator!=(string, char*)
g++ has stl iterator_traits
g++ has standard template allocator
g++ has allocator<>::rebind<>
g++ does not have non-standard allocator<>::max_size argument
-----
[root@sys4u cmake-2.8.4]# make
-----
Scanning dependencies of target cmsys
[  1%] Building C object Source/kwsys/CMakeFiles/cmsys.dir/Terminal.o
[  2%] Building C object Source/kwsys/CMakeFiles/cmsys.dir/System.o
-----
```

# MariaDB : Installation Step

```
[root@sys4u cmake-2.8.4]# make install
-----
Install the project...
-- Install configuration: ""
-- Installing: /usr/local/doc/cmake-2.8/Copyright.txt
-- Installing: /usr/local/share/cmake-2.8/Modules
-- Installing: /usr/local/share/cmake-2.8/Modules/FindPerl.cmake
-- Installing: /usr/local/share/cmake-2.8/Modules/FindLibArchive.cmake
-- Installing: /usr/local/share/cmake-2.8/Modules/CMakeDetermineASMCompiler.cmake
-- Installing: /usr/local/share/cmake-2.8/Modules/CMakeExportBuildSettings.cmake
-- Installing: /usr/local/share/cmake-2.8/Modules/FindJPEG.cmake
-----
```

# MariaDB : Installation Step

```
# vi /etc/my.cnf
-----
#[mysqld]
#datadir=/var/lib/mysql
#socket=/var/lib/mysql/mysql.sock
#user=mysql
## Disabling symbolic-links is recommended to prevent assorted security risks
#symbolic-links=0

#[mysqld_safe]
#log-error=/var/log/mysqld.log
#pid-file=/var/run/mysqld/mysqld.pid
[client]
port = 3306
socket = /usr/local/mysql/mysql.socket

[mysqld]
# generic configuration options
port = 3306
socket = /usr/local/mysql/mysql.socket
back_log = 100
max_connections = 500
max_connect_errors = 10
table_open_cache = 2048
max_allowed_packet = 16M
join_buffer_size = 8M
read_buffer_size = 2M
read_rnd_buffer_size = 16M
sort_buffer_size = 8M
thread_stack = 192K
lower_case_table_names = 0
-----
```

# MariaDB : Installation Step

```
[root@sys4u cmake-2.8.4]# cd /home/mariadb/
[root@sys4u mariadb]# ls
cmake-2.8.4  cmake-2.8.4.tar.gz  mariadb-5.5.30.tar.gz
[root@sys4u mariadb]# tar -xvf mariadb-5.5.30.tar.gz
-----
mariadb-5.5.30/mysql-test/suite/sys_vars/r/warning_count_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/thread_stack_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/default_week_format_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/collation_server_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/shared_memory_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/innodb_log_group_home_dir_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/slave_sql_verify_checksum_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/innodb_merge_sort_block_size_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/general_log_file_func.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/thread_pool_size_basic.result
mariadb-5.5.30/mysql-test/suite/sys_vars/r/sync_master_info_basic.result
-----

[root@sys4u mariadb-5.5.30]# /usr/local/bin/cmake -DCMAKE_INSTALL_PREFIX=/usr/local/mysql -DDEFAULT_CHARSET=utf8
-DDEFAULT_COLLATION=utf8_general_ci -DWITH_EXTRA_CHARSETS=all -DMYSQL_DATADIR=/usr/local/mysql/data
-DENABLED_LOCAL_INFILE=1 -DWITH_INNOBASE_STORAGE_ENGINE=1 -DMYSQL_UNIX_ADDR=/usr/local/mysql/mysql.socket
-----
-- Looking for access - found

-- Looking for aio_read

-- Looking for aio_read - found

-- Looking for alarm

-- Looking for alarm - found

-- Looking for backtrace

-- Looking for backtrace - found

-- Looking for backtrace_symbols

-- Looking for backtrace_symbols - found
```

# MariaDB : Installation Step

```
[root@sys4u mysql]# chown -R mysql:dba /usr/local/mysql*
[root@sys4u mysql]# chown mysql:dba /etc/my.cnf


export MYSQL_HOME=/usr/local/mysql
export PATH=$PATH:$MYSQL_HOME/bin:.
export ADMIN_PWD="root password"

alias ll="ls -al --color=auto"
alias mydba="mysql -uroot -p$ADMIN_PWD"
alias mymaster="mysql -uroot -p$ADMIN_PWD -e'show master status;'"
alias myslave="mysql -uroot -p$ADMIN_PWD -e'show slave status\G'"
alias mh="cd $MYSQL_HOME"
alias md="cd /home/data/mariadb-data"
alias mt="cd /home/data/mariadb-tmp"
-----

[root@sys4u mysql]# cd /usr/local/mysql/
[root@sys4u mysql]# ./scripts/mysql_install_db --user=mysql --basedir=/usr/local/mysql/
-----
WARNING: The host 'sys4u.co.kr' could not be looked up with resolveip.
This probably means that your libc libraries are not 100 % compatible
with this binary MariaDB version. The MariaDB daemon, mysqld, should work
normally with the exception that host name resolving will not work.
This means that you should use IP addresses instead of hostnames
when specifying MariaDB privileges !
Installing MariaDB/MySQL system tables in '/home/data/mariadb-data' ...
OK
-----
```

# MariaDB : Installation Step

```
[root@sys4u ~]# cp /usr/local/mysql/support-files/mysql.server /etc/init.d/mysqld
cp: overwrite `/etc/init.d/mysqld'? y

# /etc/init.d/mysqld
46 basedir=/home/mariadb
47 datadir=/home/data/mariadb-data

[root@sys4u ~]# /usr/local/mysql/bin/mysql
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 2
Server version: 5.5.30-MariaDB-log Source distribution

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

# MariaDB : Installation Step

```
MariaDB [(none)]> use mysql
Database changed
MariaDB [mysql]> create database orademo;
Query OK, 1 row affected (0.00 sec)

MariaDB [mysql]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| orademo            |
| performance_schema |
| test               |
+--------------------+
5 rows in set (0.00 sec)

MariaDB [mysql]> grant all privileges on *.* to 'root'@'%' identified by ''ecsses;
Query OK, 0 rows affected (0.03 sec)

MariaDB [mysql]> select host, user, password from user;
+-------------+------+-------------------------------------------+
| host        | user | password                                  |
+-------------+------+-------------------------------------------+
| localhost   | root |                                           |
| sys4u.co.kr | root |                                           |
| 127.0.0.1   | root |                                           |
| ::1         | root |                                           |
| localhost   |      |                                           |
| sys4u.co.kr |      |                                           |
| %           | root | *077D2C382FBC8EF28EFF2EF07C9BAD1595F0AB6D |
+-------------+------+-------------------------------------------+
7 rows in set (0.00 sec)

MariaDB [mysql]> flush privileges;
Query OK, 0 rows affected (0.00 sec)
```

# MariaDB : MariaDB Server Startup & Shutdown

```
[root@sys4u ~]# /etc/init.d/mysqld start
Starting MySQL....                                         [  OK  ]

[root@sys4u ~]# /usr/local/mysql/bin/mysql -uroot -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 3
Server version: 5.5.37-tokudb-7.1.6-MariaDB-log MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> use mysql
Database changed

MariaDB [mysql]> exit
Bye

[root@sys4u ~]# /etc/init.d/mysqld stop
Shutting down MySQL..                                      [  OK  ]
```

# MariaDB : Create DB & User

```
MariaDB [(none)]> create database firstdb; (or create database firstdb default charcter set utf8mb4;)
Query OK, 1 row affected (0.03 sec)

MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| firstdb            |
| mysql              |
| orademo            |
| performance_schema |
| test               |
+--------------------+
6 rows in set (0.10 sec)
```

# MariaDB : Create DB & User

```
MariaDB [(none)]> create database firstdb; (or create database firstdb default charcter set utf8mb4;)
Query OK, 1 row affected (0.03 sec)

MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| firstdb            |
| mysql              |
| orademo            |
| performance_schema |
| test               |
+--------------------+
6 rows in set (0.10 sec)
```

# MariaDB : Create Table

```
MariaDB [firstdb]> create table tab_test (
    -> tid bigint not null auto_increment,
    -> tname varchar(100) not null,
    -> tmeno text not null,
    -> primary key(tid),
    -> index ix_tname_tid (tname, tid)
    -> ) ENGINE=InnoDB;

MariaDB [firstdb]> show create table tab_test;
------------+
| Table    | Create Table |
+----------+----------------------------------------------------------------------------------------------------------------------|
tab_test | CREATE TABLE `tab_test` (
  `tid` bigint(20) NOT NULL AUTO_INCREMENT,
  `tname` varchar(100) NOT NULL,
  `tmeno` text NOT NULL,
  PRIMARY KEY (`tid`),
  KEY `ix_tname_tid` (`tname`,`tid`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8 |
+----------
+----------------------------------------------------------------------------------------------------------------------------+
1 row in set (0.11 sec)

MariaDB [firstdb]> desc tab_test;
+-------+--------------+------+-----+---------+----------------+
| Field | Type         | Null | Key | Default | Extra          |
+-------+--------------+------+-----+---------+----------------+
| tid   | bigint(20)   | NO   | PRI | NULL    | auto_increment |
| tname | varchar(100) | NO   | MUL | NULL    |                |
| tmeno | text         | NO   |     | NULL    |                |
+-------+--------------+------+-----+---------+----------------+
3 rows in set (0.00 sec)
```

# MariaDB : Modify table (**ONLINE**/OFFLINE)

Online Modify Schema : MariaDB 10.0, MySQL 5.6 Over

```
MariaDB [firstdb]> create table t1 (fd1 int, fd2 enum('red', 'green'));
Query OK, 0 rows affected (0.00 sec)

MariaDB [firstdb]>  alter online table t1 modify fd2 enum('red', 'green', 'blue');
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [firstdb]> alter online table t1 add fd3 int;
ERROR 1915 (HY000): Can't execute the given 'ALTER' command as online
```

- Don't Need : Data Copy to Temp Table
  - Modify Table Names
  - Modify Column Names
  - Modify Number Type Column Length
  - Modify Table Comment
  - ENUM Type item add

# MariaDB : Modify table (ONLINE/**OFFLINE**)

```
MariaDB [firstdb]> alter table tab_test add created datetime not null;
Query OK, 0 rows affected (0.30 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [firstdb]> alter table tab_test add index ix_created (created);
Query OK, 0 rows affected (0.18 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [firstdb]> desc tab_test;
+---------+--------------+------+-----+---------+----------------+
| Field   | Type         | Null | Key | Default | Extra          |
+---------+--------------+------+-----+---------+----------------+
| tid     | bigint(20)   | NO   | PRI | NULL    | auto_increment |
| tname   | varchar(100) | NO   | MUL | NULL    |                |
| tmeno   | text         | NO   |     | NULL    |                |
| created | datetime     | NO   | MUL | NULL    |                |
+---------+--------------+------+-----+---------+----------------+
4 rows in set (0.00 sec)
```

# MariaDB : DML (INSERT)

Option) ON DUPLICATE KEY UPDATE

```
MariaDB [firstdb]>  create table tab_test (
    -> fd1 int not null,
    -> fd2 varchar(50),
    -> primary key(fd1)) engine=innodb;
Query OK, 0 rows affected (0.09 sec)

MariaDB [firstdb]> insert into tab_test (fd1, fd2) values (1,'Matt');
Query OK, 1 row affected (0.06 sec)

MariaDB [firstdb]> insert into tab_test values (2, 'Toto');
Query OK, 1 row affected (0.00 sec)

MariaDB [firstdb]> insert into tab_test(fd1, fd2)
    -> values (3,'Lee') on duplicate key update fd2='Lee';
Query OK, 1 row affected (0.03 sec)

MariaDB [firstdb]> insert into tab_test(fd1, fd2)
    -> values (3, 'SeongUck') on duplicate key update fd2='SeongUck';
Query OK, 2 rows affected (0.04 sec)

MariaDB [firstdb]> select * from tab_test;
+-----+----------+
| fd1 | fd2      |
+-----+----------+
|   1 | Matt     |
|   2 | Toto     |
|   3 | SeongUck |
+-----+----------+
3 rows in set (0.00 sec)
```

# MariaDB : DML (SELECT)

```
MariaDB [firstdb]> select * from tab_test;
+-----+----------+
| fd1 | fd2      |
+-----+----------+
|   1 | Matt     |
|   2 | Toto     |
|   3 | SeongUck |
+-----+----------+
3 rows in set (0.00 sec)


MariaDB [firstdb]> select * from tab_test\G;
*************************** 1. row ***************************
fd1: 1
fd2: Matt
*************************** 2. row ***************************
fd1: 2
fd2: Toto
*************************** 3. row ***************************
fd1: 3
fd2: SeongUck
3 rows in set (0.00 sec)
```

# MariaDB : DML (UPDATE)

```
MariaDB [firstdb]> update tab_test set fd2='Brandon' where fd1=1;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [firstdb]> select * from tab_test where fd1=1;
+-----+---------+
| fd1 | fd2     |
+-----+---------+
|   1 | Brandon |
+-----+---------+
1 row in set (0.06 sec)

MariaDB [firstdb]> select * from tab_test where fd1=1;
+-----+---------+
| fd1 | fd2     |
+-----+---------+
|   1 | Brandon |
+-----+---------+
1 row in set (0.06 sec)

MariaDB [firstdb]> update tab_test set fd2='Brandon';
Query OK, 2 rows affected (0.03 sec)
Rows matched: 3  Changed: 2  Warnings: 0

MariaDB [firstdb]> select * from tab_test;
+-----+---------+
| fd1 | fd2     |
+-----+---------+
|   1 | Brandon |
|   2 | Brandon |
|   3 | Brandon |
+-----+---------+
3 rows in set (0.01 sec)
```

# MariaDB : DML (REPLACE)

```
MariaDB [firstdb]> replace tab_test set fd1=1, fd2='Matt';
Query OK, 2 rows affected (0.00 sec)

MariaDB [firstdb]> select * from tab_test where fd1=1;
+-----+------+
| fd1 | fd2  |
+-----+------+
|   1 | Matt |
+-----+------+
1 row in set (0.00 sec)
```

- REPLACE <-> UPDATE
  - If, PK or Unique key : Recode Delete & Insert
  - System Over head
  - Recommended : INSERT INTO … ON DUPLICATE KEY UP-DATE

# MariaDB : DML (DELETE)

MariaDB : AUTO Commit

```
MariaDB [firstdb]> delete from tab_test where fd1=1;
Query OK, 0 rows affected (0.00 sec)

MariaDB [firstdb]> select * from tab_test;
+-----+---------+
| fd1 | fd2     |
+-----+---------+
|   2 | Brandon |
|   3 | Brandon |
+-----+---------+
2 rows in set (0.00 sec)
```

# Reference

- Presentation : Ryusuke Kajiyama (MySQL Sales Consulting Manager, JAPAC)
  - State of the Dolphin
  - MySQL for Oracle DB

- Site : MariaDB Knowledge Base

- Book : “Real MariaDB”

# Q & A


MariaDB