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Runbook for MariaDB to MySQL 5.7* Master-Master Replication

(*This runbook uses Percona Server 5.7 with XtraDB/InnoDB, TokuDB and RocksDB)

This runbook is made to successfully replicate from MariaDB ((10.1.14.242)) to Percona Server (10.1.248.159) for MySQL 5.7 with XtraDB / InnoDB, TokuDB and RocksDB. We have discounted the following compatibility issues (in replication) between MariaDB and Percona Server for MySQL 5.7 in this runbook:

- MariaDB and MySQL have different GTID implementations, and that these are not compatible with each other.
- MySQL doesn't support log-basename

System variables configured for MariaDB to Percona Server for MySQL 5.7 replication:

- MariaDB system variables for replication:
 - Set binlog_format to "MIXED"
 - Disable GTID replication if enabled / configured before
- Percona Server for MySQL 5.7 system variable
 - Set binlog_format to "MIXED"
 - Disable GTID replication if enabled / configured before

MariaDB-MySQL Replication compatibility

	MASTER							
SLAVE	MariaDB 5.5	MariaDB-10.0	MariaDB-10.1	MariaDB-10.2	MariaDB-10.3	MySQL-5.6	MySQL-5.7	MySQL-8.0
MariaDB-5.5	YES	NO	NO	NO	NO	YES	NO	NO
MariaDB-10.0	YES	YES	YES	YES	YES	YES	YES	YES
MariaDB-10.1	YES	YES	YES	YES	YES	NO	YES	YES
MariaDB-10.2	NO	YES	YES	YES	YES	NO	YES	YES
MariaDB-10.3	NO	YES	YES	YES	YES	NO	YES	YES
MySQL-5.6	YES	YES	YES	YES	YES	YES	YES	YES
MySQL-5.7	YES	YES	YES	YES	YES	YES	YES	YES
MySQL-8	YES	YES	YES	YES	YES	YES	YES	YES

** MariaDB and MySQL have different GTID implementations, and that these are not compatible with each other.
 ** MySQL doesn't support log-basename.
 ** When replicating from MySQL to MariaDB in GTID mode, MariaDB replaces MySQL GTID events to MariaDB GTID events.

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Screenshots of successful MariaDB to MySQL Replication (PoC)

Screenshots of Working MariaDB to **Percona Server for MySQL 5.7** replication with storage engines InnoDB / XtraDB, TokuDB and RocksDB.

Screenshot 1 (MariaDB server we have used)

```
MariaDB [(none)]> select version();
+-----+
| version() |
+-----+
| 10.3.9-MariaDB-1:10.3.9+maria~xenial-log |
+-----+
1 row in set (0.000 sec)
```

Screenshot 2 (Percona Server for MySQL 5.7 we have used)

```
Server version: 5.7.22-22-log Percona Server (GPL), Release '22', Revision 'f62d93c'

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owners.

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

mysql> █
```

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Screenshot 3 (we have used MIXED binlog_format for both MariaDB and Percona Server)

```
MariaDB [(none)]> select @@binlog_format;
+-----+
| @@binlog_format |
+-----+
| MIXED           |
+-----+
1 row in set (0.000 sec)
```

```
mysql> select @@binlog_format;
+-----+
| @@binlog_format |
+-----+
| MIXED           |
+-----+
1 row in set (0.00 sec)
```

Screenshot 4 - Confirm MariaDB master position

```
MariaDB [(none)]> show master status;
+-----+-----+-----+-----+
| File           | Position | Binlog_Do_DB | Binlog_Ignore_DB |
+-----+-----+-----+-----+
| mariadb-bin.000007 |      1243 |              |                  |
+-----+-----+-----+-----+
1 row in set (0.000 sec)
```

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Screenshot 5 - We have updated the position of MariaDB binary logs in Percona Server (we have recovered the backup from MariaDB here)

```
mysql> stop slave;
Query OK, 0 rows affected (0.01 sec)

mysql> CHANGE MASTER TO MASTER_HOST = '192.168.56.3', MASTER_USER = 'repl', MASTER_PASSWORD = 'repl', MASTER_LOG_FILE = 'mariadb-bin.000007', MASTER_LOG_POS = 1243;
Query OK, 0 rows affected, 2 warnings (0.03 sec)

mysql> start slave;
Query OK, 0 rows affected (0.01 sec)
```

Screenshot 6 - slave status

```
mysql> show slave status\G;
***** 1. row *****
      Slave_IO_State: Waiting for master to send event
      Master_Host: 192.168.56.3
      Master_User: repl
      Master_Port: 3306
      Connect_Retry: 60
      Master_Log_File: mariadb-bin.000007
      Read_Master_Log_Pos: 1243
      Relay_Log_File: Bangalore-relay-bin.000002
      Relay_Log_Pos: 455
      Relay_Master_Log_File: mariadb-bin.000007
      Slave_IO_Running: Yes
      Slave_SQL_Running: Yes
      Replicate_Do_DB:
      Replicate_Ignore_DB:
      Replicate_Do_Table:
      Replicate_Ignore_Table:
      Replicate_Wild_Do_Table:
      Replicate_Wild_Ignore_Table:
      Last_Errno: 0
      Last_Error:
      Skip_Counter: 0
      Exec_Master_Log_Pos: 1243
      Relay_Log_Space: 666
      Until_Condition: None
```


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Testing MariaDB to Percona Server for MySQL 5.7 replication

Table "titles" on MariaDB(InnoDB) :

```
MariaDB [employees]> show create table titles\G;
***** 1. row *****
      Table: titles
Create Table: CREATE TABLE `titles` (
  `emp_no` int(11) NOT NULL,
  `title` varchar(50) NOT NULL,
  `from_date` date NOT NULL,
  `to_date` date DEFAULT NULL,
  PRIMARY KEY (`emp_no`,`title`,`from_date`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1
PARTITION BY RANGE `columns`(`from_date`)
(PARTITION `p01` VALUES LESS THAN ('1985-12-31') ENGINE = InnoDB,
PARTITION `p02` VALUES LESS THAN ('1986-12-31') ENGINE = InnoDB,
PARTITION `p03` VALUES LESS THAN ('1987-12-31') ENGINE = InnoDB,
PARTITION `p04` VALUES LESS THAN ('1988-12-31') ENGINE = InnoDB,
PARTITION `p05` VALUES LESS THAN ('1989-12-31') ENGINE = InnoDB,
PARTITION `p06` VALUES LESS THAN ('1990-12-31') ENGINE = InnoDB,
PARTITION `p07` VALUES LESS THAN ('1991-12-31') ENGINE = InnoDB,
PARTITION `p08` VALUES LESS THAN ('1992-12-31') ENGINE = InnoDB,
PARTITION `p09` VALUES LESS THAN ('1993-12-31') ENGINE = InnoDB,
PARTITION `p10` VALUES LESS THAN ('1994-12-31') ENGINE = InnoDB,
PARTITION `p11` VALUES LESS THAN ('1995-12-31') ENGINE = InnoDB,
PARTITION `p12` VALUES LESS THAN ('1996-12-31') ENGINE = InnoDB,
PARTITION `p13` VALUES LESS THAN ('1997-12-31') ENGINE = InnoDB,
PARTITION `p14` VALUES LESS THAN ('1998-12-31') ENGINE = InnoDB,
PARTITION `p15` VALUES LESS THAN ('1999-12-31') ENGINE = InnoDB,
PARTITION `p16` VALUES LESS THAN ('2000-12-31') ENGINE = InnoDB,
PARTITION `p17` VALUES LESS THAN ('2001-12-31') ENGINE = InnoDB,
PARTITION `p18` VALUES LESS THAN ('2002-12-31') ENGINE = InnoDB,
PARTITION `p19` VALUES LESS THAN (MAXVALUE) ENGINE = InnoDB)
1 row in set (0.000 sec)
```

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```
MariaDB [employees]> select count(1) from titles;
+-----+
| count(1) |
+-----+
|    443310 |
+-----+
1 row in set (0.000 sec)
```

Table "titles" on Percona Server (RocksDB) :

```
mysql> show create table titles\G;
***** 1. row *****
      Table: titles
Create Table: CREATE TABLE `titles` (
  `emp_no` int(11) NOT NULL,
  `title` varchar(50) NOT NULL,
  `from_date` date NOT NULL,
  `to_date` date DEFAULT NULL,
  PRIMARY KEY (`emp_no`,`title`,`from_date`)
) ENGINE=ROCKSDB DEFAULT CHARSET=latin1
/*!50500 PARTITION BY RANGE  `columns(from_date)`
(PARTITION p01 VALUES LESS THAN ('1985-12-31') ENGINE = ROCKSDB,
 PARTITION p02 VALUES LESS THAN ('1986-12-31') ENGINE = ROCKSDB,
 PARTITION p03 VALUES LESS THAN ('1987-12-31') ENGINE = ROCKSDB,
 PARTITION p04 VALUES LESS THAN ('1988-12-31') ENGINE = ROCKSDB,
 PARTITION p05 VALUES LESS THAN ('1989-12-31') ENGINE = ROCKSDB,
 PARTITION p06 VALUES LESS THAN ('1990-12-31') ENGINE = ROCKSDB,
 PARTITION p07 VALUES LESS THAN ('1991-12-31') ENGINE = ROCKSDB,
 PARTITION p08 VALUES LESS THAN ('1992-12-31') ENGINE = ROCKSDB,
 PARTITION p09 VALUES LESS THAN ('1993-12-31') ENGINE = ROCKSDB,
 PARTITION p10 VALUES LESS THAN ('1994-12-31') ENGINE = ROCKSDB,
 PARTITION p11 VALUES LESS THAN ('1995-12-31') ENGINE = ROCKSDB,
 PARTITION p12 VALUES LESS THAN ('1996-12-31') ENGINE = ROCKSDB,
 PARTITION p13 VALUES LESS THAN ('1997-12-31') ENGINE = ROCKSDB,
 PARTITION p14 VALUES LESS THAN ('1998-12-31') ENGINE = ROCKSDB,
 PARTITION p15 VALUES LESS THAN ('1999-12-31') ENGINE = ROCKSDB,
 PARTITION p16 VALUES LESS THAN ('2000-12-31') ENGINE = ROCKSDB,
 PARTITION p17 VALUES LESS THAN ('2001-12-31') ENGINE = ROCKSDB,
 PARTITION p18 VALUES LESS THAN ('2002-12-31') ENGINE = ROCKSDB,
 PARTITION p19 VALUES LESS THAN (MAXVALUE) ENGINE = ROCKSDB) */
1 row in set, 1 warning (0.00 sec)
```

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```
[mysql> select count(1) from titles;
+-----+
| count(1) |
+-----+
|    443310 |
+-----+
1 row in set (0.22 sec)

mysql> █
```

Data INSERT on MariaDB table "titles"

```
MariaDB [employees]>
MariaDB [employees]> insert into titles values (16071980,'Data-Geek', '2015-06-11',
'2017-09-04');
Query OK, 1 row affected (0.008 sec)

MariaDB [employees]> commit;
Query OK, 0 rows affected (0.000 sec)
```

Data count on MariaDB table "titles" after INSERT

```
MariaDB [employees]> select count(1) from titles;
+-----+
| count(1) |
+-----+
|    443311 |
+-----+
1 row in set (0.152 sec)
```


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Validate successful replication on Percona Server (RocksDB)

```
mysql> select count(1) from titles;
+-----+
| count(1) |
+-----+
|    443311 |
+-----+
1 row in set (0.22 sec)
```

```
mysql> select * from titles where title='Data-Geek';
+-----+-----+-----+-----+
| emp_no | title    | from_date | to_date   |
+-----+-----+-----+-----+
| 16071980 | Data-Geek | 2015-06-11 | 2017-09-04 |
+-----+-----+-----+-----+
1 row in set (0.21 sec)

mysql>
```