Syniti

Data Replication

Setup Notes for MariaDB Transactional Replications

Version 9.8.2

Syniti

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Document History

Version	Author	Date	Reviewer	Date	Comments
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These notes provide essential information for setting up replications using **MariaDB** as a source database for one-way mirroring and synchronization. The setup process for a refresh replication can usually be completed using the Syniti Data Replication wizards without additional documentation because it does not involve access to the MariaDB logs.

For complete details on the setup process, check the *Syniti Data Replication User Guide* available from the Management Center **Help** menu.

This guide describes the setup process using either the Log Reader or Log Server Agent options for one-way mirroring and synchronization when replicating data from a MariaDB database. For mirroring and synchronization replications using MariaDB as a source, Syniti DR offers several approaches:

- **Log Reader**: Queries the MariaDB log directly
- **Log Server Agent**: Uses a Windows service and a Syniti DR Log Server component to query the MariaDB log for increased performance when dealing with large amounts of data.
- **Triggers**: Uses Syniti DR triggers installed on the MariaDB database to log changes (Ask the Technical Support team at http://support.hitsw.com to see if this approach would work in your application and to obtain the separate document *Setup Notes for Trigger-based Transactional Replications*.)

Connection Type

MySQL .NET Data Provider available for download from MySQL.

Note: Trigger-based transactional replications are supported for v. 4.1.5 and later; log- and trigger-based transactional replications are supported for v. 5.1.31 and later

Assembly: MySql.Data (file name: MySql.Data.dll)

Sample path: C:\MySQL\Connector-net-5.0.3\Driver\bin\net2.0\release\MySql.Data.dll

Additional Files Required for MariaDB Log-based Replications

If you are planning to set up replications using the MariaDB binary log, contact Technical Support to obtain an additional component (DBMySqlUtil.zip). Be sure to state whether you are using the 32-bit or 64-bit version of Syniti DR.

When you receive the zip file, unzip it and place the contents in the Syniti DR installation folder (usually C:\Program Files\Syniti\Data Replication)

Syniti DR User Permissions for MariaDB

When setting up replications that use MariaDB as either a source or target database, you need to be sure that the user ID used for making connections to the database has sufficient privileges to complete all the operations required for Syniti DR to perform a replication.

This section is organized by the type of replication you want to perform. It describes in detail all the user authorities required during the setup and execution of replications.

Refresh with MariaDB as Either Source or Target Database

1. AUTHORITY TO CONNECT TO DATABASE
   This should already be granted when the user is created. However, here is the syntax, just in case. The command below actually creates a new user, granting basic privileges. Privileges must be assigned to both the

localhost and '%' to give access remotely from any client machine. The FLUSH PRIVILEGES command make the changes immediately available without restarting the MariaDB service.

```
USE <SCHEMA>;
GRANT USAGE ON *.* TO '<UID>'@'localhost' IDENTIFIED BY '<PWD>';
GRANT USAGE ON *.* TO '<UID>'@'%' IDENTIFIED BY '<PWD>';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
USE mariadb;
GRANT USAGE ON *.* TO 'syniti'@'localhost' IDENTIFIED BY 'syniti';
GRANT USAGE ON *.* TO 'syniti'@'%' IDENTIFIED BY 'syniti';
FLUSH PRIVILEGES;
```

2. AUTHORITY TO SELECT CATALOG
   No additional permissions needed.

3. AUTHORITY TO SELECT TABLES
   Needed for schemas other than the one for which CONNECT_DB permission has been granted (the user has already read authority.)

```
GRANT SELECT ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT SELECT ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT SELECT ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT SELECT ON mariadb.Table1 TO 'syniti'@'%';
FLUSH PRIVILEGES;
```

4. AUTHORITY TO CREATE TABLES
   To create a target table in the Management Center (as part of the Create Table Wizard), Syniti DR requires permissions to modify the database schema.

   MariaDB allows you to grant privileges even on database objects that do not exist. In such cases, the privileges to be granted must include the **CREATE** privilege. This behavior is designed to enable the database administrator to prepare user accounts and privileges for database objects that are to be created at a later time.

```
GRANT CREATE ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT CREATE ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Alternatively, you can run the command using the '*' wildcard:

```
GRANT CREATE ON <SCHEMA>.* TO '<UID>'@'localhost';
GRANT CREATE ON <SCHEMA>.* TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT CREATE ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT CREATE ON mariadb.Table1.* TO 'syniti'@'%';
FLUSH PRIVILEGES;
```

5. AUTHORITY TO UPDATE TABLES

To create a target table in the Management Center (as part of the Create Table Wizard), Syniti DR requires write permissions to the database. The following command is needed for schemas other than the one on which the CONNECT_DB permission has been granted (where the user has already write authority.)

```
GRANT INSERT, UPDATE, DELETE ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT INSERT, UPDATE, DELETE ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT INSERT, UPDATE, DELETE ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT INSERT, UPDATE, DELETE ON mariadb.Table1 TO 'syniti'@'%';
FLUSH PRIVILEGES;
```

6. AUTHORITY TO DROP TABLES, ALTER TABLES (optional)

The use of these commands from within Syniti DR is entirely optional (i.e. not necessary for running a refresh replication.) They are used if you choose to remove a table from MariaDB or change the table via the Management Center SQL Query tab. This syntax can be used for schemas other than the one for which the CONNECT_DB permission has been granted (where the user has already drop table authority.)

```
GRANT DROP ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT DROP ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT DROP ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT DROP ON mariadb.Table1 TO 'syniti'@'%';
```

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```
FLUSH PRIVILEGES;
```

Transactional Replications/Initial Refresh with MariaDB as Either Source or Target Database

This section includes information for mirroring where MariaDB is the data source, and synchronization where MariaDB can be either the "source" or "target" data source.

1. AUTHORITY TO CONNECT TO DATABASE
   This should already be granted when the user is created. However, here is the syntax, just in case. The command below actually creates a new user, granting basic privileges. Privileges must be assigned to both the localhost and '%' to give access remotely from any client machine. The FLUSH PRIVILEGES command makes the changes immediately available without restarting the MariaDB service.

   ```
   USE <SCHEMA>;
   GRANT USAGE ON *.* TO '<UID>'@'localhost' IDENTIFIED BY '<PWD>';
   GRANT USAGE ON *.* TO '<UID>'@'%' IDENTIFIED BY '<PWD>';
   FLUSH PRIVILEGES;
   ```

   Example where syniti is the user ID and mariadb is the schema:

   ```
   USE mariadb;
   GRANT USAGE ON *.* TO 'syniti'@'localhost' IDENTIFIED BY 'syniti';
   GRANT USAGE ON *.* TO 'syniti'@'%' IDENTIFIED BY 'syniti';
   FLUSH PRIVILEGES;
   ```

2. AUTHORITY TO SELECT CATALOG
   No additional permissions needed.

3. AUTHORITY TO SELECT TABLES
   Needed for schemas other than the one for which CONNECT_DB permission has been granted (the user has already read authority.)

   ```
   GRANT SELECT ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
   GRANT SELECT ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
   FLUSH PRIVILEGES;
   ```

   Example where syniti is the user ID and mariadb is the schema:

   ```
   GRANT SELECT ON mariadb.Table1 TO 'syniti'@'localhost';
   GRANT SELECT ON mariadb.Table1 TO 'syniti'@'%';
   FLUSH PRIVILEGES;
   ```

4. AUTHORITY TO CREATE TABLES
   To create a target table in the Management Center (as part of the Create Table Wizard), Syniti DR requires

permissions to modify the database schema.

MariaDB allows you to grant privileges even on database objects that do not exist. In such cases, the privileges to be granted must include the **CREATE** privilege. This behavior is designed to enable the database administrator to prepare user accounts and privileges for database objects that are to be created at a later time.

```
GRANT CREATE ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT CREATE ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Alternatively, you can run the command using the '*' wildcard:

```
GRANT CREATE ON <SCHEMA>.* TO '<UID>'@'localhost';
GRANT CREATE ON <SCHEMA>.* TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT CREATE ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT CREATE ON mariadb.Table1.* TO 'syniti'@'%';
FLUSH PRIVILEGES;
```

5. AUTHORITY TO UPDATE TABLES

To create a target table in the Management Center (as part of the Create Table Wizard), Syniti DR requires write permissions to the database. The following command is needed for schemas other than the one on which the CONNECT_DB permission has been granted (where the user has already write authority.)

```
GRANT INSERT, UPDATE, DELETE ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT INSERT, UPDATE, DELETE ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT INSERT, UPDATE, DELETE ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT INSERT, UPDATE, DELETE ON mariadb.Table1 TO 'syniti'@'%';
FLUSH PRIVILEGES;
```

6. AUTHORITY TO DROP TABLES, ALTER TABLES (optional)

The use of these commands from within Syniti DR is entirely optional (i.e. not necessary for running a refresh replication.) They are used if you choose to remove a table from MariaDB or change the table via the Management Center SQL Query tab. This syntax can be used for schemas other than the one for which the CONNECT_DB permission has been granted (where the user has already drop table authority.)

```
GRANT DROP ON <SCHEMA>.<TABLE> TO '<UID>'@'localhost';
GRANT DROP ON <SCHEMA>.<TABLE> TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where syniti is the user ID and mariadb is the schema:

```
GRANT DROP ON mariadb.Table1 TO 'syniti'@'localhost';
GRANT DROP ON mariadb.Table1 TO 'syniti'@'%';
FLUSH PRIVILEGES;
```

7. AUTHORITY TO SET UP TRANSACTIONAL REPLICATIONS and ACCESS LOG
   For transactional replications using **triggers**, the following authorities are needed: read-write access, create and drop access to _dbm__trg_objs and to _dbm__masterlog, as well as read-write access to the single log files. Authority is needed for schemas other than the one for which CONNECT_DB permission has been granted (where the user has already all authorities). Log files do not have a fixed name but are generated on the fly. Therefore, the authority needs to be granted on a schema level. Notice that the last GRANT command covers also the GRANT assigned to the _dbm__trg_objs and to _dbm__masterlog tables. <SCHEMA> in all cases below should be the schema where the master table is defined.

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```
GRANT SELECT, INSERT, UPDATE, DELETE ON <SCHEMA>._dbm__trg_objs TO '<UID>'@'localhost';
GRANT SELECT, INSERT, UPDATE, DELETE ON <SCHEMA>._dbm__trg_objs TO '<UID>'@'%';
GRANT SELECT, INSERT, UPDATE, DELETE ON <SCHEMA>._dbm__masterlog TO '<UID>'@'localhost';
GRANT SELECT, INSERT, UPDATE, DELETE ON <SCHEMA>._dbm__masterlog TO '<UID>'@'%';
GRANT SELECT, INSERT, UPDATE, DELETE ON <SCHEMA>.* TO '<UID>'@'localhost';
GRANT SELECT, INSERT, UPDATE, DELETE ON <SCHEMA>.* TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

For MariaDB versions 5.1.6 and above, trigger-based replications, also execute the following :

```
GRANT TRIGGER ON <SCHEMA>.* TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

For transactional replications using the **MariaDB binary log**, you need to grant REPLICATION SLAVE privilege to the Syniti DR MariaDB user ID that will connect to the database.

```
GRANT SELECT, PROCESS, REPLICATION CLIENT, REPLICATION SLAVE, RELOAD ON *.* TO '<UID>'@'%';
FLUSH PRIVILEGES;
```

Example where user ID that is used to replicate data is syniti:

```
GRANT SELECT, PROCESS, REPLICATION CLIENT, REPLICATION SLAVE, RELOAD ON *.* TO syniti@'%';
FLUSH PRIVILEGES;
```

Note: If using MariaDB/MySQL versions before 5.5, you also need to grant the following privileges: FILE, SUPER

```
GRANT SELECT, PROCESS, FILE, SUPER, REPLICATION CLIENT, REPLICATION SLAVE, RELOAD ON
*.* TO syniti@'%';
FLUSH PRIVILEGES;
```

MariaDB System Settings

If you are using MariaDB version 5.5 or above as your source database for mirroring via the MariaDB binary log, you need to configure MariaDB so that Syniti DR can read the database's binary log.

Before Syniti DR can read the binary log, row-based logging must be enabled for the database. To enable row-based logging, properties must be set in the MariaDB Server Instance Configuration file.

1. Find the file "my.ini" which can be found in the directory where MariaDB is installed.
    This file is the "MariaDB Server Instance Configuration File".

  2. Open the file my.ini.

  3. Scroll to the end of the file and add the following properties:
     #For Syniti DR replication
     log-bin=binlog
     binlog-format=ROW
     server-id=111

- log-bin=binlog
  In case users want to locate them, the binlog files are found in directory specified by "datadir" in "my.ini"

- binlog-format=ROW
  You can force the replication format by starting the MariaDB server with --binlog-format=type. When set, all replication slaves connecting to the server will read the events according to this setting. ROW causes replication to be row-based.

- server-id=<*unique_value*>
  For each server participating in replication, you should pick a positive integer in the range from 1 to 232 – 1, and each ID must be different from every other ID in use by any other replication master or slave. For example, you could set the value as 123:
  server-id=123

4. Save the my.ini file.

5. Restart the server.

Add a Source Connection Wizard
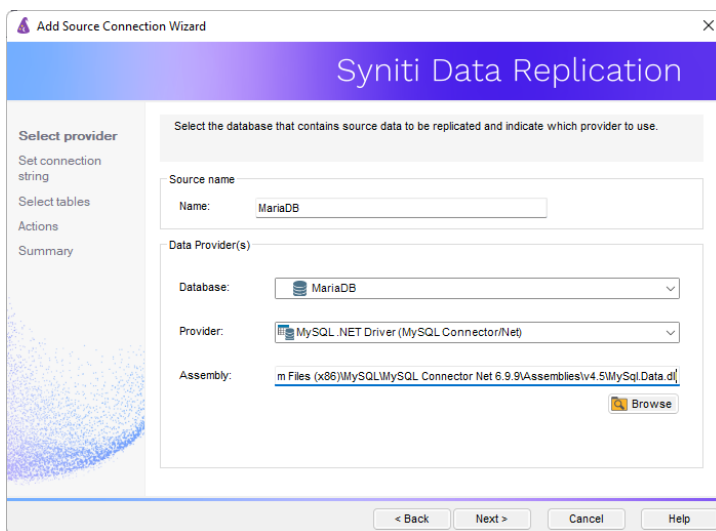
Select Provider Screen

Database

Select MariaDB from the drop-down list.

Provider

The value MySQL .NET Driver is provided automatically. You do not need to change this value.

Assembly

The pathname to the .NET Assembly MySql.Data.dll. If the value is not available, Syniti DR displays a message when you continue in the Source Connection wizard, allowing you to go back and type in the path. Find out the location of the assembly in your environment by searching for the file name, then enter the path and the assembly file name.

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Enable Transactional Replication Wizard

For transactional replications (mirroring and synchronization), use the Enable Transactional Replication wizard after setting up a source connection. The following field(s) require specific information for MariaDB.

Log Type Screen

Select whether you plan to perform replications using the Log Reader (default) or Log Server Agent.

Log Settings Screen

Case Sensitive Table Names

Check this option to manage databases with case-sensitive table names.