**Mariabackup Installation and Configuration for version 10.1.41**

**Requirements:**

* The MariaDB Database Server (version 10.1.41) should be installed.
* Internet access is available to download the MariaDB Package Repository and the Mariabackup.

1. **Data Backup**
2. **Install and configure MariaDB Package Repository**

**1.1** Install and configure MariaDB Package Repository if it was not installed during the MariaDB server installation. Do the following on the server that runs the MariaDB Database engine.

*curl -sS https://downloads.mariadb.com/MariaDB/mariadb\_repo\_setup | sudo bash -s -- --mariadb-server-version="mariadb-10.1.41"*

NOTE: On Red Hat Enterprise Linux (RHEL) and CentOS, the MariaDB Package Repository setup script performs the following tasks:

* Creates a repository configuration file at /etc/yum.repos.d/mariadb.repo.
* Imports the GPG public key used to verify the signature of MariaDB software packages with rpm --import from downloads.mariadb.com.
  1. **Install Mariabackup**

sudo yum install MariaDB-backup

* 1. **Create a database user that runs Mariabackup**
* Connect to the MariaDB as a root or administrator

mysql -u *<your-admin-username>*  -p *<your-admin-password>*

* Run the following command to create a user for Mariabackup

*CREATE USER 'db-backup-user'@'localhost' IDENTIFIED BY '<db-backup-password>';*

*GRANT RELOAD, PROCESS, LOCK TABLES, REPLICATION CLIENT ON \*.\* TO 'db-backup-user'@'localhost';*

1. **Deploy Mariabackup Automation Scripts**

**2.1** **Create the directory structure for Mariabackup and its automation scripts**

The following is the default directory structure needed to run the Mariabackup job and its automation scripts. Create these directories as follows and modify the access privileges:

sudo mkdir /var/mariadb

sudo mkdir /var/mariadb/backup

sudo mkdir /var/mariadb/scripts

sudo chmod -R 755 /var/mariadb

* 1. **Deploy the Mariabackup Automation scripts**

Go to the folder where you saved the scripts and execute the following command:

*sudo cp db-backup-job.sh /var/mariadb/scripts*

*sudo cp db-backup.properties /var/mariadb/scripts*

*sudo chmod -R 755 /var/mariadb/scripts*

* 1. **Configure the automation script**

Go to /var/mariadb/scripts and edit the db-backup.properties file:

|  |  |  |
| --- | --- | --- |
| **Property** | **Value** | **Description** |
| userName | db-backup-user | The username created (above) for Mariabackup user. *No change required unless the created username is different from this value* |
| password |  | *Enter the password created (above) for the db-backup-user.* |
| backup\_dir | /var/mariadb/backup | The default directory created (above) to store the backup data that the Mariabackup generates |
| base\_backup\_prefix | base | The prefix of the folder name that holds the full backup data. *No change required* |
| inc\_backup\_prefix | inc | The prefix of the folder name that holds the incremental backup data. *No change required* |
| inc\_limit | 6 | The number of incremental backups to be created.  This default value creates 1 full back-up on the first execution and the following 6 executions create incremental backups based on the full backup created.  *No change required unless this default value is not needed* |
| inc\_count | 0 | The incremental backup counter that the automation script uses. *No change required* |
| Last\_inc\_dir | *No initial value required* | The folder name of the last successful backup, which will be used as a base folder by the automation script on the next execution. This value is updated by the automation script. *No change required* |

1. **Install the Systemd Service and the Systemd Timer**

Copy the *mariadb-backup.service* and the *mariadb-backup.timer* files to /etc/systemd/system directory.

* Execute the following commands to enable the *mariadb-backup.service*:

*sudo touch /etc/systemd/system/mariadb-backup.service*

*sudo chmod 664 /etc/systemd/system/mariadb-backup.service*

*sudo systemctl enable /etc/systemd/system/mariadb-backup.service*

* Execute the following commands to enable the *mariadb-backup.timer*:

*sudo touch /etc/systemd/system/mariadb-backup.timer*

*sudo chmod 664 /etc/systemd/system/mariadb-backup.timer*

*sudo systemctl enable /etc/systemd/system/mariadb-backup.timer*

* Execute the following commands to reload the systemctl daemon:

*sudo systemctl daemon-reload*

* Execute the following commands to start the Systemd timer:

*sudo systemctl start mariadb-backup.timer*

1. **Example**

Assuming that you have completed all of the above configurations successfully and started the mariadb-backup.timer on 2019/12/31. If this systemd service is set to run the backup process every day at 3:00 am so it creates the first backup file at 3:00 am on 2020/01/01 in */var/mariadb/backup* directory. The first backup data should always be the full backup of the database so the directory that holds the backup data has a name prefix ‘base’ in this format: *base-yyyyMMDD-hhmmss*. On the following six days, this process creates incremental backups. Its directory name starts with ‘inc’ and it has this format: *inc--yyyyMMDD-hhmmss*. Then after creating 1 full backup and 6 incremental backups, the script creates another full back up on the 8th day and then the process continues in a similar pattern.

**Run date Backup created**

Wed Jan 01 2020 base-20200101-030001

Thu Jan 02 2020 inc-20200102-030023

Fri Jan 03 2020 inc-20200103-030011

Sat Jan 04 2020 inc-20200104-030012

Sun Jan 05 2020 inc-20200105-030024

Mon Jan 06 2020 inc-20200105-030025

Tue Jan 07 2020 inc-20200106-030009

Wed Jan 08 2020 base-20200107-030003

**Note:** The minutes and seconds on the folder name yyyyMMDD-hhmmss shown above are for example purposes. These values will be different for each run depending on the length of processing time and speed.

1. **Data Restoration**

Whenever restoration is needed from the backup files, the last full backup should be the starting point of the restoration process. Then incremental backups that were created after the last full backup should be applied on the base full backup. The following is a step by step instruction to restore the data from the backup files created.

1. Prepare the base backup

*sudo mariabackup --prepare --apply-log-only --target-dir=/var/mariadb/backup/base-YYYYMMDD-hhmmss*, where *base-YYYYMMDD-hhmmss* is the directory name of the most recent full backup created. Running this command brings the base full backup, that is, /var/mariadb/backup, into sync with the changes contained in the InnoDB redo log collected while the backup was taken.

1. Apply the incremental changes to the base full backup. Run the following command for the first incremental backup that was created after the creation date of the full backup (used in step 1).

*sudo mariabackup --prepare --apply-log-only --target-dir=/var/mariadb/backup/ base-YYYYMMDD-hhmmss --incremental-dir=/var/mariadb/backup/inc-YYYYMMDD-hhmmss*

Repeat the above step in order (oldest to latest) for all incremental backups created after the creation date of the full backup.

1. Stop the MariaDB Server process*: sudo systemctl stop mariadb.service*
2. Ensure that the datadir is empy. The datadir is the directory where the MariaDB server stores data. This might be different if your installation is customized. For a default datadir, which is /var/lib/mysql, do the following to move what is currently in the datadir to a temporary directory:

*sudo mv /var/lib/mysql /tmp/mysql*

1. Restore the backup:

*sudo mariabackup --copy-back --target-dir=/var/mariadb/backup/base-YYYYMMDD-hhmmss*, where *base-YYYYMMDD-hhmmss* is the directory name of the most recent full backup created.

1. Fix Permissions

*sudo chcon -Rt mysqld\_db\_t /var/lib/mysql*

*sudo chcon -Ru system\_u /var/lib/mysql*

*sudo chown -R mysql:mysql /var/lib/mysql*

1. Start the MariaDB database server: *sudo systemctl start mariadb.service*

Verify that

* The database connection works
* The most recent data in the transaction tables is restored
* The data in the reference tables is restored

1. **Setting the Systemd Timer**

Before setting the Systemd Timer, check the date time settings of the server on which the Systemd Timer and its service will be deployed. If the server time is in UTC, the Systemd Timer should be set in accordingly.

1. **Timer settings for Testing the scripts**

The default systemd timer launches the backup service once per day. Just for testing purposes, you can set the system timer to run as follows on the mariadb-backup.timer file:

* OnCalendar=\*:0/1 (to run it on every minute)
* OnCalendar= \*-\*-\* \*:\*:00 (another expression to run it on every minute)
* OnCalendar= \*-\*-\* \*:00:00 (to run it hourly)
* OnCalendar= \*-\*-\* 05:40:00 (to run it at 05:40 AM based on your server time settings)

1. **Useful commands for troubleshooting**

* sudo journalctl –xe
* sudo systemctl is-active mariadb-backup.timer
* sudo systemctl list-timers