# Администрирование сетевых подсистем

## Установка и настройка MariaDB (Лабораторная работа №6)

Заур Мустафаев

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Российский университет дружбы народов, Москва, Россия

# Цели и задачи работы

# Цель лабораторной работы

Получение практических навыков установки, настройки и администрирования системы управления базами данных MariaDB, а также освоение базовых операций работы с базами данных.

# Выполнение лабораторной работы

# Установка пакетов

```
Installed:
  mariadb-3:10.11.11-1.el10.x86_64        mariadb-backup-3:10.11.11-1.el10.x86_64       mariadb-client-utils-3:10.11.11-1.el10.x86_64
  mariadb-common-3:10.11.11-1.el10.noarch mariadb-errmsg-3:10.11.11-1.el10.noarch       mariadb-gssapi-server-3:10.11.11-1.el10.x86_64
  mariadb-server-3:10.11.11-1.el10.x86_64 mariadb-server-utils-3:10.11.11-1.el10.x86_64 mysql-selinux-1.0.14-1.el10_0.noarch
  perl-DBD-MariaDB-1.23-10.el10.x86_64    perl-Sys-Hostname-1.25-512.2.el10_0.x86_64

Complete!
[root@server.zmustafaev.net ~]#
[root@server.zmustafaev.net ~]# ls /etc/my.cnf.d/
auth_gssapi.cnf  enable_encryption.preset  mysql-clients.cnf   provider_lz4.cnf  provider_snappy.cnf
client.cnf       mariadb-server.cnf        provider_bzip2.cnf  provider_lzo.cnf  spider.cnf
[root@server.zmustafaev.net ~]# cat /etc/my.cnf
#
# This group is read both both by the client and the server
# use it for options that affect everything
#
[client-server]

#
# include all files from the config directory
#
!includedir /etc/my.cnf.d

[root@server.zmustafaev.net ~]#
```

**Рис. 1:** Установка пакетов MariaDB

# Конфигурационные файлы MariaDB

```
Installed:
  mariadb-3:10.11.11-1.el10.x86_64        mariadb-backup-3:10.11.11-1.el10.x86_64       mariadb-client-utils-3:10.11.11-1.el10.x86_64
  mariadb-common-3:10.11.11-1.el10.noarch mariadb-errmsg-3:10.11.11-1.el10.noarch       mariadb-gssapi-server-3:10.11.11-1.el10.x86_64
  mariadb-server-3:10.11.11-1.el10.x86_64 mariadb-server-utils-3:10.11.11-1.el10.x86_64 mysql-selinux-1.0.14-1.el10_0.noarch
  perl-DBD-MariaDB-1.23-10.el10.x86_64    perl-Sys-Hostname-1.25-512.2.el10_0.x86_64

Complete!
[root@server.zmustafaev.net ~]#
[root@server.zmustafaev.net ~]# ls /etc/my.cnf.d/
auth_gssapi.cnf  enable_encryption.preset  mysql-clients.cnf   provider_lz4.cnf  provider_snappy.cnf
client.cnf       mariadb-server.cnf        provider_bzip2.cnf  provider_lzo.cnf  spider.cnf
[root@server.zmustafaev.net ~]# cat /etc/my.cnf
#
# This group is read both both by the client and the server
# use it for options that affect everything
#
[client-server]

#
# include all files from the config directory
#
!includedir /etc/my.cnf.d

[root@server.zmustafaev.net ~]#
```

**Рис. 2:** Просмотр конфигурационных файлов MariaDB

# Запуск сервиса MariaDB

```
[root@server.zmustafaev.net ~]# systemctl start mariadb
[root@server.zmustafaev.net ~]# systemctl enable mariadb
Created symlink '/etc/systemd/system/mysql.service' → '/usr/lib/systemd/system/mariadb.service'.
Created symlink '/etc/systemd/system/mysqld.service' → '/usr/lib/systemd/system/mariadb.service'.
Created symlink '/etc/systemd/system/multi-user.target.wants/mariadb.service' → '/usr/lib/systemd/system/mariadb.service'.
[root@server.zmustafaev.net ~]# ss -tulpen | grep mysql
[root@server.zmustafaev.net ~]# ss -tulpen | grep maria
tcp   LISTEN 0      80           0.0.0.0:3306       0.0.0.0:*    users:(("mariadbd",pid=12123,fd=18))
                                                                 uid:27 ino:63007 sk:15 cgroup:/system.slice/mariadb.service <->
tcp   LISTEN 0      80             [::]:3306          [::]:*    users:(("mariadbd",pid=12123,fd=19))
                                                                 uid:27 ino:63008 sk:20 cgroup:/system.slice/mariadb.service v6only:1 <->

[root@server.zmustafaev.net ~]#
```

Рис. 3: Проверка прослушивания порта 3306

# Первичная настройка безопасности

```
By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them.  This is intended only for testing, and to make the installation
go a bit smoother.  You should remove them before moving into a
production environment.

Remove anonymous users? [Y/n]
 ... Success!

Normally, root should only be allowed to connect from 'localhost'.  This
ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n]
 ... Success!

By default, MariaDB comes with a database named 'test' that anyone can
access.  This is also intended only for testing, and should be removed
before moving into a production environment.

Remove test database and access to it? [Y/n]
 - Dropping test database...
 ... Success!
 - Removing privileges on test database...
 ... Success!

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n]
 ... Success!

Cleaning up...

All done!  If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
[root@server.zmustafaev.net ~]#
```

# Системные базы данных

```
[root@server.zmustafaev.net ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 13
Server version: 10.11.11-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
4 rows in set (0.000 sec)

MariaDB [(none)]> exit;
Bye
[root@server.zmustafaev.net ~]#
```

Рис. 5: Список баз данных MariaDB

# Статус сервера MariaDB

```
[root@server.zmustafaev.net ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 14
Server version: 10.11.11-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]> status
--------------
mysql  Ver 15.1 Distrib 10.11.11-MariaDB, for Linux (x86_64) using  EditLine wrapper

Connection id:          14
Current database:
Current user:           root@localhost
SSL:                    Not in use
Current pager:          stdout
Using outfile:          ''
Using delimiter:        ;
Server:                 MariaDB
Server version:         10.11.11-MariaDB MariaDB Server
Protocol version:       10
Connection:             Localhost via UNIX socket
Server characterset:    latin1
Db     characterset:    latin1
Client characterset:    utf8mb3
Conn.  characterset:    utf8mb3
UNIX socket:            /var/lib/mysql/mysql.sock
Uptime:                 5 min 18 sec

Threads: 1  Questions: 27  Slow queries: 0  Opens: 20  Open tables: 13  Queries per second avg: 0.084
--------------

MariaDB [(none)]>
```

# Настройка UTF-8

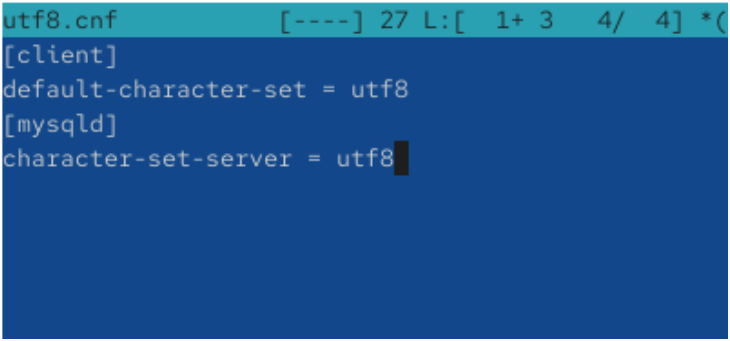


**Рис. 7:** Настройка файла utf8.cnf

# Проверка изменений кодировки

```
[root@server.zmustafaev.net my.cnf.d]# systemctl restart mariadb
[root@server.zmustafaev.net my.cnf.d]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 3
Server version: 10.11.11-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]> status
--------------
mysql  Ver 15.1 Distrib 10.11.11-MariaDB, for Linux (x86_64) using  EditLine wrapper

Connection id:          3
Current database:
Current user:           root@localhost
SSL:                    Not in use
Current pager:          stdout
Using outfile:          ''
Using delimiter:        ;
Server:                 MariaDB
Server version:         10.11.11-MariaDB MariaDB Server
Protocol version:       10
Connection:             Localhost via UNIX socket
Server characterset:    utf8mb3
Db     characterset:    utf8mb3
Client characterset:    utf8mb3
Conn.  characterset:    utf8mb3
UNIX socket:            /var/lib/mysql/mysql.sock
Uptime:                 10 sec

Threads: 1  Questions: 4  Slow queries: 0  Opens: 17  Open tables: 10  Queries per second avg: 0.400
--------------

MariaDB [(none)]>
```

# Создание базы данных

```
MariaDB [(none)]>
MariaDB [(none)]> CREATE DATABASE addressbook CHARACTER SET utf8 COLLATE utf8_general_ci;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> USE addressbook;
Database changed
MariaDB [addressbook]> SHOW TABLES;
Empty set (0.000 sec)

MariaDB [addressbook]> CREATE TABLE city(name VARCHAR(40), city VARCHAR(40));
Query OK, 0 rows affected (0.006 sec)

MariaDB [addressbook]> INSERT INTO city(name,city) VALUES ('Иванов', 'Москва');
Query OK, 1 row affected (0.001 sec)

MariaDB [addressbook]> INSERT INTO city(name,city) VALUES ('Петров', 'Сочи');
Query OK, 1 row affected (0.001 sec)

MariaDB [addressbook]> INSERT INTO city(name,city) VALUES ('Сидоров', 'Дубна');
Query OK, 1 row affected (0.001 sec)

MariaDB [addressbook]> SELECT * FROM city;
+----------------+-------------+
| name           | city        |
+----------------+-------------+
| Иванов         | Москва      |
| Петров         | Сочи        |
| Сидоров        | Дубна       |
+----------------+-------------+
3 rows in set (0.000 sec)

MariaDB [addressbook]>
```

# Создание и заполнение таблицы

```
MariaDB [(none)]>
MariaDB [(none)]> CREATE DATABASE addressbook CHARACTER SET utf8 COLLATE utf8_general_ci;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> USE addressbook;
Database changed
MariaDB [addressbook]> SHOW TABLES;
Empty set (0.000 sec)

MariaDB [addressbook]> CREATE TABLE city(name VARCHAR(40), city VARCHAR(40));
Query OK, 0 rows affected (0.006 sec)

MariaDB [addressbook]> INSERT INTO city(name,city) VALUES ('Иванов', 'Москва');
Query OK, 1 row affected (0.001 sec)

MariaDB [addressbook]> INSERT INTO city(name,city) VALUES ('Петров', 'Сочи');
Query OK, 1 row affected (0.001 sec)

MariaDB [addressbook]> INSERT INTO city(name,city) VALUES ('Сидоров', 'Дубна');
Query OK, 1 row affected (0.001 sec)

MariaDB [addressbook]> SELECT * FROM city;
+----------------+-------------+
| name           | city        |
+----------------+-------------+
| Иванов         | Москва      |
| Петров         | Сочи        |
| Сидоров        | Дубна       |
+----------------+-------------+
3 rows in set (0.000 sec)

MariaDB [addressbook]>
```

# Управление пользователями и правами

```
MariaDB [addressbook]>
MariaDB [addressbook]> CREATE USER zmustafaev@'%' IDENTIFIED BY '123456';
Query OK, 0 rows affected (0.001 sec)

MariaDB [addressbook]> GRANT SELECT,INSERT,UPDATE,DELETE ON addressbook.* TO zmustafaev@'%';
Query OK, 0 rows affected (0.001 sec)

MariaDB [addressbook]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.000 sec)

MariaDB [addressbook]> DESCRIBE city;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| name  | varchar(40) | YES  |     | NULL    |       |
| city  | varchar(40) | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
2 rows in set (0.001 sec)

MariaDB [addressbook]>
```

Рис. 11: Описание структуры таблицы city

# Проверка прав доступа

```
[root@server.zmustafaev.net my.cnf.d]# mysqlshow -u root -p
Enter password:
+--------------------+
|     Databases      |
+--------------------+
| addressbook        |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
[root@server.zmustafaev.net my.cnf.d]# mysqlshow -u zmustafaev -p addressbook
Enter password:
Database: addressbook
+--------+
| Tables |
+--------+
| city   |
+--------+
[root@server.zmustafaev.net my.cnf.d]#
```

**Рис. 12:** Просмотр баз данных и таблиц с помощью mysqlshow

# Создание резервных копий

```
[root@server.zmustafaev.net my.cnf.d]#
[root@server.zmustafaev.net my.cnf.d]# mkdir -p /var/backup
[root@server.zmustafaev.net my.cnf.d]# mysqldump -u root -p addressbook > /var/backup/addressbook.sql
Enter password:
[root@server.zmustafaev.net my.cnf.d]# mysqldump -u root -p addressbook | gzip > /var/backup/addressbook.sql.gz
Enter password:
[root@server.zmustafaev.net my.cnf.d]# mysqldump -u root -p addressbook | gzip > $(date +/var/backup/addressbook.%Y%m%d.%H%M%S.sql.gz)
Enter password:
[root@server.zmustafaev.net my.cnf.d]# ls /var/backup/
addressbook.20251216.065508.sql.gz  addressbook.sql  addressbook.sql.gz
[root@server.zmustafaev.net my.cnf.d]# mysql -u root -p addressbook < /var/backup/addressbook.sql
Enter password:
[root@server.zmustafaev.net my.cnf.d]# zcat /var/backup/addressbook.sql.gz | mysql -u root -p addressbook
Enter password:
[root@server.zmustafaev.net my.cnf.d]#
```

**Рис. 13:** Резервное копирование и восстановление базы данных

# Подготовка provisioning-скрипта

Vagrantfile | dns.sh | dhcp.sh | http.sh | mysql.sh

```
#!/bin/bash
echo "Provisioning script $0"
systemctl restart named
echo "Install needed packages"
dnf -y install mariadb mariadb-server
echo "Copy configuration files"
cp -R /vagrant/provision/server/mysql/etc/* /etc
mkdir -p /var/backup
cp -R /vagrant/provision/server/mysql/var/backup/* /var/backup
echo "Start mysql service"
systemctl enable mariadb
systemctl start mariadb
if [[ ! -d /var/lib/mysql/mysql ]]
then
echo "Securing mariadb"
mysql_secure_installation <<EOF
y
123456
123456
y
y
y
y
EOF
echo "Create database"
mysql -u root -p123456 <<EOF
CREATE DATABASE addressbook CHARACTER SET utf8 COLLATE utf8_general_ci;
EOF
mysql -u root -p123456 addressbook < /var/backup/addressbook.sql
fi
```

**Рис. 14:** Сценарий автоматической установки и настройки MariaDB

# Выводы по проделанной работе

# Вывод

В ходе лабораторной работы была установлена и настроена СУБД MariaDB. Реализованы меры безопасности, создана пользовательская база данных и настроены права доступа. Выполнены операции резервного копирования и восстановления, а также подготовлены средства автоматизации развёртывания, что упрощает администрирование базы данных в виртуальной среде.