

Лабораторная работа №6

Дисциплина: Администрирование сетевых подсистем

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Раздел 1

1. Цель работы

1.1 Цель работы

- Приобретение практических навыков установки и конфигурирования СУБД MariaDB

Раздел 2

2. Выполнение лабораторной работы

2.1 Установка MariaDB

- Выполнен переход в режим суперпользователя
- Установлены пакеты `mariadb` и `mariadb-server` через `dnf`
- Подключены зависимости и компоненты сервера

```
[alkamal@server.alkamal.net ~]$ sudo -i
[sudo] password for alkamal:
[root@server.alkamal.net ~]# dnf -y install mariadb mariadb-server
Last metadata expiration check: 2:17:21 ago on Sun 08 Feb 2026 01:48:25 PM UTC.
Dependencies resolved.
=====
 Package           Architecture Version      Repository    Size
 =====
Installing:
 mariadb          x86_64        3:10.5.29-3.el9_7   appstream   1.6 M
 mariadb-server   x86_64        3:10.5.29-3.el9_7   appstream   9.7 M
Installing dependencies:
 mariadb-common   x86_64        3:10.5.29-3.el9_7   appstream   27 k
 mariadberrmsg    x86_64        3:10.5.29-3.el9_7   appstream   210 k
 mysql-selinux    noarch       1.0.14-1.el9_6     appstream   36 k
 perl-DBD-MariaDB x86_64        1.21-17.el9      appstream   149 k
 perl-Sys-Hostname x86_64        1.23-481.1.el9_6 appstream   15 k
Installing weak dependencies:
 mariadb-backup   x86_64        3:10.5.29-3.el9_7   appstream   6.5 M
 mariadb-gssapi-server x86_64        3:10.5.29-3.el9_7   appstream   14 k
 mariadb-server-utils x86_64        3:10.5.29-3.el9_7   appstream   210 k
=====
Transaction Summary
=====
Install 10 Packages
```

- Запущена служба mariadb
- Добавлена в автозагрузку (enable)
- Созданы символические ссылки systemd

```
[root@server.alkamal.net ~]# systemctl start mariadb
[root@server.alkamal.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.alkamal.net ~]# ss -tulpen | grep mysql
[root@server.alkamal.net ~]# ss -tulpen | grep 3306
tcp    LISTEN  0          80                  *:3306           *:*      users:(("mariadb",pid=14932,fd=19))
                                                uid:27  ino:51822 sk:12 cgroup:/system.slice/mariadb.service v6only:0 <→
```

Рисунок 2: Запуск и включение службы mariadb через systemctl

- Проверено прослушивание порта 3306
- Процесс mariadb находится в состоянии LISTEN

```
[root@server.alkamal.net ~]# systemctl start mariadb
[root@server.alkamal.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/mariadb.service.
[root@server.alkamal.net ~]# ss -tulpen | grep mysql
[root@server.alkamal.net ~]# ss -tulpen | grep 3306
tcp    LISTEN  0      80          *:3306          *:*      users:(("mariadbd",pid=1
4932,fd=19)
                           uid:27  ino:51822 sk:12 cgroup:/system.slice/mariadb.service v6only:0 <->
```

Рисунок 3: Проверка прослушивания порта 3306 процессом mariadb

- Выполнен `mysql_secure_installation`
- Включена аутентификация `unix_socket`
- Установлен пароль `root`
- Удалены анонимные пользователи
- Запрещён удалённый доступ `root`
- Удалена тестовая БД

```
[root@server.alkamal.net ~]# mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
haven't set the root password yet, you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password or using the unix_socket ensures that nobody
can log into the MariaDB root user without the proper authorisation.

You already have your root account protected, so you can safely answer 'n'.

Switch to unix_socket authentication [Y/n] y
Enabled successfully!
Reloading privilege tables..
... Success!

You already have your root account protected, so you can safely answer 'n'.
```



```
Remove anonymous users? [Y/n] y
... 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] y
... 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] y
- 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] y
... 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!
```

Рисунок 5: Выполнение mysql_secure_installation и настройка параметров безопасности

- Выполнен вход mysql -u root -p
- Отображена версия сервера

```
[root@server.alkamal.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: 10.5.29-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.
```

Рисунок 6: Вход в MariaDB под пользователем root

● Просмотр списка клиентских команд

```
MariaDB [(none)]> \h

General information about MariaDB can be found at
http://mariadb.org

List of all client commands:
Note that all text commands must be first on line and end with ';'
?          (\?) Synonym for `help'.
charset    (\C) Switch to another charset. Might be needed for processing binlog with multi-byte charsets.
clear      (\c) Clear the current input statement.
connect    (\r) Reconnect to the server. Optional arguments are db and host.
delimiter  (\d) Set statement delimiter.
edit      (\e) Edit command with $EDITOR.
ego        (\G) Send command to MariaDB server, display result vertically.
exit      (\q) Exit mysql. Same as quit.
go        (\g) Send command to MariaDB server.
help      (\h) Display this help.
nopager   (\n) Disable pager, print to stdout.
notee     (\t) Don't write into outfile.
nowarning (\w) Don't show warnings after every statement.
pager     (\P) Set PAGER [to_pager]. Print the query results via PAGER.
print     (\p) Print current command.
prompt    (\R) Change your mysql prompt.
quit      (\q) Quit mysql.
rehash    (\#) Rebuild completion hash.
sandbox   (\-) Disallow commands that access the file system (except \P without an argument and \e).
source    (\.) Execute an SQL script file. Takes a file name as an argument.
status    (\s) Get status information from the server.
system   (\!) Execute a system shell command.
tee       (\T) Set outfile [to_outfile]. Append everything into given outfile.
use      (\u) Use another database. Takes database name as argument.
warnings (\W) Show warnings after every statement.
```



- Выполнен SHOW DATABASES;
- Отображены системные БД

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

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

Рисунок 8: Отображение списка системных баз данных (SHOW DATABASES)

2.2 Конфигурация кодировки символов

- Выполнен вход в MariaDB
- Команда `Status` показала:
- Server characterset – latin1
- Db characterset – latin1
- Client – utf8

```
[root@server.alkamal.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: 10.5.29-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 10.5.29-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
Current database:
```

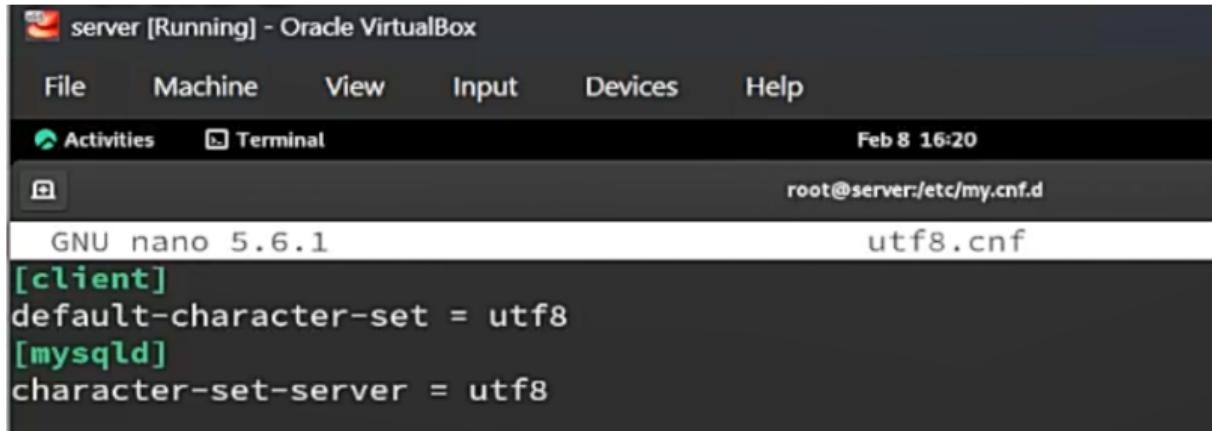


- Создан файл /etc/my.cnf.d=utf8.cnf

```
[root@server.alkamal.net ~]# cd /etc/my.cnf.d
[root@server.alkamal.net my.cnf.d]# touch utf8.cnf
[root@server.alkamal.net my.cnf.d]# nano utf8.cnf
```

Рисунок 10: Создание файла utf8.cnf в каталоге /etc/my.cnf.d

- Добавлены параметры:
- default-character-set = utf8
- character-set-server = utf8



```
root@server:/etc/my.cnf.d# nano utf8.cnf
[client]
default-character-set = utf8
[mysqld]
character-set-server = utf8
```

Рисунок 11: Содержимое файла utf8.cnf с параметрами кодировки UTF-8

- Перезапущена служба mariadb
- Повторно выполнен status
- Все параметры кодировки — utf8

```
[root@server.alkamal.net my.cnf.d]# systemctl restart mariadb
[root@server.alkamal.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: 10.5.29-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 10.5.29-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:          10.5.29-MariaDB MariaDB Server
Protocol version:        10
Connection:              Localhost via UNIX socket
Server characterset:     utf8
Db      characterset:    utf8
Client characterset:     utf8
Conn.   characterset:    utf8
UNIX socket:             /var/lib/mysql/mysql.sock
```



2.3 Создание базы данных

- Выполнен вход под root

```
[root@server.alkamal.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 4
Server version: 10.5.29-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)]> █
```

Рисунок 13: Вход в MariaDB под пользователем root

- Создана БД addressbook (utf8, utf8_general_ci)
- Выполнен SHOW TABLES ; – таблицы отсутствуют

```
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 (0.013 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 (0.009 sec)

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

Рисунок 14: Создание базы данных addressbook и проверка списка таблиц

- Создана таблица city (VARCHAR(40))
- Добавлены записи: Иванов, Петров, Сидоров
- Выполнен SELECT * FROM city;

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

MariaDB [addressbook]> I
```

Рисунок 15: Создание таблицы city, вставка данных и результат SELECT * FROM city

- Создан пользователь alkamal@'%'
- Назначены права SELECT, INSERT, UPDATE, DELETE
- Выполнен FLUSH PRIVILEGES ;
- Проверена структура таблицы (DESCRIBE city;)

```
MariaDB [addressbook]> CREATE USER alkamal@'%' IDENTIFIED BY '654321';
Query OK, 0 rows affected (0.009 sec)

MariaDB [addressbook]> GRANT SELECT,INSERT,UPDATE,DELETE ON addressbook.* TO alkamal@'%';
Query OK, 0 rows affected (0.010 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 (0.000 sec)

MariaDB [addressbook]> quit
Bye
```

Рисунок 16: Создание пользователя, назначение прав и описание структуры таблицы city

- Проверка через mysqlshow
- База addressbook и таблица city доступны

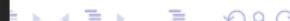
```
[root@server.alkamal.net my.cnf.d]# mysqlshow -u root -p
Enter password:
+-----+
| Databases |
+-----+
| addressbook
| information_schema
| mysql
| performance_schema
+-----+
[root@server.alkamal.net my.cnf.d]# mysqlshow -u root -p addressbook
Enter password:
Database: addressbook
+-----+
| Tables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

Рисунок 17: Просмотр баз данных и таблиц addressbook с помощью mysqlshow

2.4 Резервные копии

- Создан каталог /var/backup
- Выполнен дамп:
- mysqldump > addressbook.sql
- Создан сжатый дамп:
- mysqldump | gzip
- Создан дамп с временной меткой
- Выполнено восстановление из .sql
- Выполнено восстановление из .sql.gz

```
[root@server.alkamal.net my.cnf.d]# mkdir -p /var/backup
[root@server.alkamal.net my.cnf.d]# mysqldump -u root -p addressbook > /var/backup/addressbook.sql
Enter password:
[root@server.alkamal.net my.cnf.d]# mysqldump -u root -p addressbook | gzip > /var/backup/addressbook.sql.gz
Enter password:
[root@server.alkamal.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.alkamal.net my.cnf.d]# mysql -u root -p addressbook < /var/backup/addressbook.sql
Enter password:
[root@server.alkamal.net my.cnf.d]# zcat /var/backup/addressbook.sql.gz | mysql -u root -p addressbook
Enter password:
```



2.5 Внесение изменений в настройки внутреннего окружения виртуальной машины

- Создан каталог mysql/etc/my.cnf.d
- Создан каталог mysql/var/backup
- Скопирован utf8.cnf
- Скопированы резервные копии

```
[root@server.alkamal.net my.cnf.d]# cd /vagrant/provision/server
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/mysql/etc/my.cnf.d
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/mysql/var/backup
[root@server.alkamal.net server]# cp -R /etc/my.cnf.d/utf8.cnf /vagrant/provision/server/
mysql/etc/my.cnf.d/

[root@server.alkamal.net server]# cp -R /var/backup/* /vagrant/provision/server/mysql/var
/backup/
[root@server.alkamal.net server]# cd /vagrant/provision/server
[root@server.alkamal.net server]# touch mysql.sh
[root@server.alkamal.net server]# chmod +x mysql.sh
[root@server.alkamal.net server]# nano mysql.sh
```

Рисунок 19: Создание каталогов mysql и копирование конфигурации и резервных копий

- Создан скрипт mysql.sh
- Установка mariadb и mariadb-server
- Копирование конфигурации
- Создание /var/backup
- Запуск и включение mariadb
- Неинтерактивный mysql_secure_installation
- Создание БД addressbook
- Восстановление из резервной копии

```
GNU nano 5.6.1                                     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
```



- В Vagrantfile добавлен provision-блок
- Тип shell
- Путь provision/server/mysql.sh
- preserve_order: true

```
C: > work > alkamal > vagrant > Vagrantfile
46   server.vm.provision "server mysql",
47     type: "shell",
48     preserve_order: true,
49     path: "provision/server/mysql.sh"
```

Рисунок 21: Добавление конфигурации server mysql в Vagrantfile

Раздел 3

3. Выводы

3.1 Выводы

- Установлен и настроен сервер MariaDB
- Подтверждено прослушивание порта 3306
- Выполнена базовая настройка безопасности
- Настроена кодировка utf8
- Создана БД addressbook и таблица city
- Настроены права пользователя
- Освоены процедуры резервного копирования и восстановления
- Реализована автоматизация через mysql.sh и Vagrantfile