Preparations

In this project, you will measure the performance of a client-server application. To make things easier, we have chosen a very simple scenario: A client host sending SQL queries (over the network) to a database server. In the following, we explain how to setup the client and the server.

You will need two computers. The server host must run Linux (a virtual machine should work, too) since some of the measurement tools that you will use in this project don't exist for Windows. We haven't tried MacOS. For the client, the only thing you need is Java or Python, depending on your preferences, so all OS should work.

Installing a database server

Warning: In the following we install a database server that can be accessed from outside your computer and we create a user who has full privileges on the test database. Don't do this on a computer that contains important information.

Installing MariaDB (or MySQL)

Install MariaDB with

```
sudo apt-get install mariadb-server
```

If you prefer you can also use MySQL. MariaDB is compatible to MySQL and all commands shown below work for both systems.

Configuring the database so it can be reached from outside

Add the line

```
bind-address = 0.0.0.0
```

to the file

```
/etc/mysql/my.cnf
```

and restart the server

```
/etc/init.d/mysql restart
```

Creating the test database

Download and install the example database by following the instructions on

https://github.com/datacharmer/test_db

(you don't need the partitioned tables)

Now you have a database named "employees" that you can use for the experiments. Among others, the database contains a table "salaries" with around 2.8 million rows.

Create a new user who can manage the database. Start the database command-line tool with

```
sudo mysql
```

and create the user with

```
CREATE USER 'myUserName';
```

Then give the new user full access to the database:

```
GRANT ALL PRIVILEGES ON employees.* TO 'myUserName' IDENTIFIED BY 'MyNewPassword' ;
```

Leave the command-line tool by pressing Control-C.

Installing MySQL Workbench (if you prefer a GUI)

It's probably more convenient to use a GUI to inspect the database. Install the MySQL workbench

```
sudo apt-get install mysql-workbench
```

and start it with

```
mysql-workbench
```

To connect to your database you have to first configure the connection. Use the name of the user created above. When you connect to the database, the workbench will ask you for the password for that user (see above). You can ignore the "Connection Warning".

The remote database client

For small tests, you can install the "mysql" tool on the client computer

```
sudo apt-get install mariadb-client
```

and send a query to the database on the command line:

```
mysql -h IPAddressOfYourServer -u myUserName -pMyNewPassword -e "SELECT * FROM employees.salaries LIMIT 5;"
```

In this project, you have to send database queries from a remote client computer to the database server and do various measurements, such as response time, amount of data sent over the network, etc. We want to do a lot of measurements, therefore the process of sending the queries should be automated. There is an example on Moodle that shows how to send queries from a Java client. If you prefer, you can write your client in Python but we cannot help you with that.