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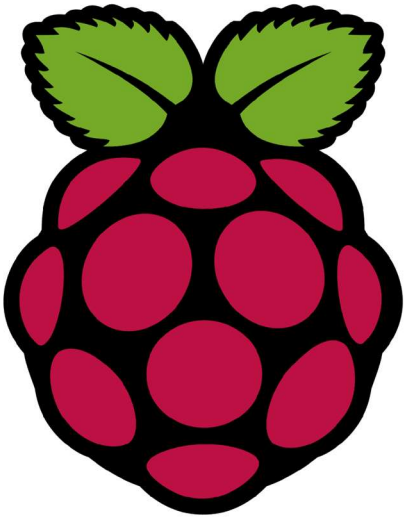
PROJECT REPORT

S103: INSTALLATION OF A DEVELOPMENT STATION



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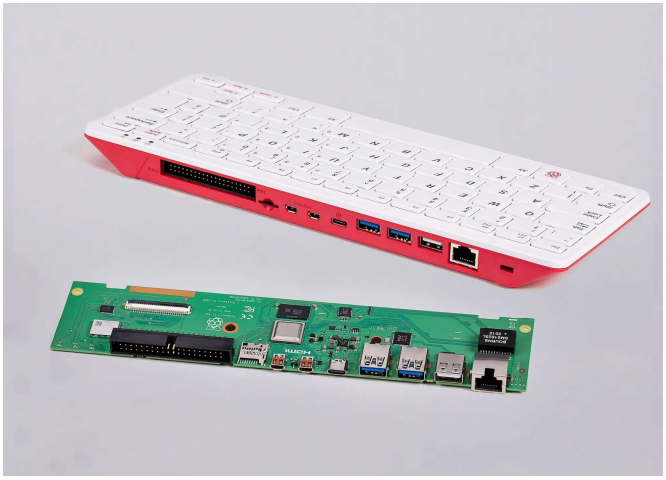
SUMMARY

INTRODUCTION

The purpose of the S103 Project was to install and configure a DBMS (Data Base Management System) on a Raspberry Pi. It's a small single-board computer with an ARM processor.



To do that we had a Raspberry Pi 400, an SD Card with an adapter, an HDMI cable and a Network cable with an adapter. There were basically three steps to succeed this project. Firstly we had to install an Operating System (OS). Then we had to make an ssh connection. Finally we had to install and configure the DBMS. At the end, we did some verifications with a python script that was given to test if everything was good.

Texts with `this font` are commands entered in the terminal. Dark red texts starting with "//" are comments about the commands.

INSTALLING AN OS

We chose to install Raspberry Pi OS. Raspberry Pi OS (formerly Raspbian) is a Debian-based operating system for Raspberry Pi. Since 2015, it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the Raspberry Pi family of compact single-board computers. To install it we had to connect the SD Card to an IUT's computer. Then we flashed it with `rpi-imager`. It's a software available on Linux that allows users to easily install operating systems to a microSD card. Also in this software, we create the user student whose password is pwdstudent, who will be useful to access the raspberry through ssh .

Beyond that, we also had to set date and time permanently. We did it thanks to the Network Time Protocol (NTP) and to make it, we used those commands:

```
systemctl status ntp // Check the status of the NTP service to see if it's active

sudo apt update  // Update the package index to retrieve the latest one

apt install ntp//synchronize the server's clock with time servers sudo by installing ntp
```

Then we reboot the raspberry and we can see that the date and hour are well set now.

MAKING AN SSH CONNECTION

There are different ways to make an ssh connection. The first one and probably the easiest is to configure it while installing the OS with rpi-imager. However at this moment of the project we did not realise that we could make the ssh connection this way. That's why we used an other method to make the ssh connection. We configured it manually with those commands :

```
sudo apt update

sudo apt install openssh-server      // install an ssh server

sudo systemctl status ssh       // check the status of the ssh server

sudo systemctl start ssh // start the ssh server

sudo systemctl enable ssh       // enable the ssh connection
```

This is how we configured the ssh connection. We used the Internet to find this. After that, we could connect to the raspberry from the computer on which it was connected, with this command:

```
ssh 10.42.0.2 -o user=student
```

Password: `pdwstudent`

INSTALLING A DBMS

As it was recommended in the S103 referenced guide, the DBMS we chose to install is `mariadb`. For this installation we used the following commands:

```
sudo apt install mariadb-server      // install mariadb server
```

After that command you have to say yes (typing the letter 'y') and then:

```
sudo mysql_secure_installation //configure security options (password for root)
```

```
mysql -uroot -p //connect to the server with the user root after typing its password
```

CONFIGURATION OF THE DBMS

The first thing we need is to create a user :

```
CREATE USER 'prof'@'10.42.0.1' IDENTIFIED BY 'pwdprof'; //Create a user named 'prof' who is from the IP Address '10.42.0.1' and the password needed to connect to this user is 'pwdprof'
```

We created the Database Camping by typing this command in `maria-db` :

```
CREATE DATABASE CAMPING ;  // install mariadb server
```

However, the user 'prof' in this state can't do anything, even request the database. So we have execute a command to give all the permission to the user 'prof' :

```
GRANT ALL PRIVILEGES  ON CAMPING TO 'prof'@'10.42.0.1'; //Give to user 'prof' all permission
```

Then we created the tables with those commands :

```
CREATE TABLE ACTIVITE (NumActivite INT PRIMARY KEY,NomActivite
VARCHAR(255),TypeActivite VARCHAR(255)) ;

CREATE TABLE CAMPING (NumCamping INT PRIMARY KEY, NomCamping VARCHAR(40), AddrCamping
VARCHAR(255),TelCamping VARCHAR(30), DateOuv DATE, DateFerm DATE, NbEtoiles INT,
QualiteFrance VARCHAR(255)) ;

CREATE TABLE ACTICAMPING (NumCamping INT, NumActivite INT, PrixActivite FLOAT (5,2),
CONSTRAINT NC_FK FOREIGN KEY (NumCamping) REFERENCES CAMPING (NumCamping), CONSTRAINT
NA_FK FOREIGN KEY (NumActivite) REFERENCES ACTIVITE (NumActivite), CONSTRAINT AC_PK
PRIMARY KEY (NumCamping,NumActivite));
```

Then we can insert the values into the tables with the commands :

```
INSERT INTO CAMPING VALUES (1,'Le Paradis','123 Rue de la Foret','01 23 45 67 89'
,'2023-05-01', '2023-10-31',4,'Excellente');
      INSERT INTO CAMPING VALUES (2,'Belle Nature','456 Avenue des Montagnes','98 76
54 32 10' ,'2023-06-15', '2023-06-15',3,'Bonne');
      INSERT INTO ACTIVITE VALUES (101,'Randonnee pedestre','Plein air');
      INSERT INTO ACTIVITE VALUES (102,'Escalade','Aventure');
      INSERT INTO ACTIVITE VALUES (103,'Yoga','Bien-être');
      INSERT INTO ACTICAMPING VALUES (1,101,20.50);
```

```
INSERT INTO ACTICAMPING VALUES (1,102,15.75);
INSERT INTO ACTICAMPING VALUES (2,101,18.00);
```

Finally, the only thing missing is to change a mariadb's configuration file :

`sudo nano /etc/mysql/mariadb.conf.d/50-server.cnf` // Command who allows to modify the file 50-server.cnf.

Inside this file we have to change the value `127.0.0.1` of `bind_adress` to `0.0.0.0`.

VERIFICATION

We could check that our work was good two times.

First we executed the script on the Raspberry Pi. We find out a problem with the ssh connection. We had a problem with the host. After we find an other problem with the user 'prof'. We configured it in 'localhost'. To fix it we modify 'localhost' by '10.42.0.2'.

Then we executed the script on the computer connected by ethernet cable with the Raspberry. We find out again a problem. We did not create the students.txt file that contains the name of the group members. Then we had a problem to connect to the DBMS with the user 'prof'. The 'prof' user was configured in '10.42.0.2', which is the local IP address of the Raspberry. Or we were connected on the computer, not the Raspberry, which means that we had to configure 'prof' with '10.42.0.1'. This is the local IP address of the computer.

WORK DIVISION

Actually we have done all the work together. However we can say that :

- the installation of the OS was done by Loic
- the configuration of the ssh connection was done by Lowan
- the installation of the DBMS by Loic
- the configuration of the DBMS was done by Matys
- the verification was done by Lowan and Matys

CONCLUSION

Unsurprisingly, this project denotes much of the course linked to it. Unlike R104 where we just have to do what is asked, in S103, it's much more about finding ourselves the most important thing relevant to do, the most useful command depending on the desired effect. We can affirm that this is an excellent project because beyond just pushing us to put our knowledge to use, it helps us develop skills such as the distribution of work and good time management which are essential in the professional world and what's more, setting up a workstation for development was for most of us something entirely new. This project therefore constitutes a very beneficial experience for us students.