Setup RaspPi Heidi Server

- download / install RaspPi Imager from https://www.raspberrypi.org/software/
- `> rpi-imager` choose recommended image
- plug in SD card toRaspPi, login (user pi, passwd raspberry / raspberrz on german keyboards) startup, step through setup (no WiFi)
- resize root partition on SD-card to 16GiB (e.g. use gparted on a other system)
- backup and clean /opt
- create a separated fs mounted to /opt (best a separated device, a partition should do too)
- remove auto-login: edit `/etc/lightdm/lightdm.conf` comment out line `autologin-user...`
- enable ssh for remote sessions:
  ```
  > sudo systemctl enable ssh
  ```

- install php, apache, mysql (mariadb)
  ```
  > sudo apt install apache2 php mariadb-server mariadb-client
  > sudo systemctl enable mysql (ignore „too many symlinks")
  > sudo mysql_secure_installation (set new root pw/ all other „Y")
  > sudo mysql -u root
  MariaDB [mysql]> USE mysql;
  MariaDB [mysql]> UPDATE user SET plugin='mysql_native_password' WHERE
  User='root';
  MariaDB [mysql]> FLUSH PRIVILEGES;
  MariaDB [mysql]> exit;
  ```

- change store-location for mysql:
  ```
  > sudo systemctl stop mariadb.service
  > sudo mkdir /opt/heidi
  > sudo mv /var/lib/mysql /opt/heidi/.
  > sudo chown -R mysql /opt/heidi/mysql
  > sudo chgrp -R mysql /opt/heidi/mysql
  > sudo nano /etc/mysql/mariadb.conf.d/50-server.cnf
    -> datadir = /opt/heidi/mysql
  > sudo systemctl start mariadb.service
  ```

- `> sudo apt install phpmyadmin`, choose option apache2, do not reinstall database
- open phpmyadmin website and login with mariadb root login, phpmyadmin will request you to create basic structures
- new database: name „Heidi" Kollation: utf8_general_ci
- new user: name „HeidiTracker", localhost, INSERT / UPDATE / SELECT only on database „Heidi"
- create administrative user besides root with less privileges
- new Table „TrackerData" InnoDB with 13 Columns (additionally you may add an auto-incremented primary key column):
  ```
  TrackerID    VARCHAR   9
  Longitude    DECIMAL   9,6
  Latitude     DECIMAL   9,6
  Altitude     DECIMAL   9,6
  TimeStamp    DATETIME
  Battery      DECIMAL   3,2   NULL
  Temperature  DECIMAL   5,2   NULL
  FreeValue1   VARCHAR   16    NULL
  FreeValue2   VARCHAR   16    NULL
  FreeValue3   VARCHAR   16    NULL
  FreeValue4   VARCHAR   16    NULL
  FreeValue5   VARCHAR   16    NULL
  FreeValue6   VARCHAR   16    NULL
  FreeValue7   VARCHAR   16    NULL
  ErrorCode    VARCHAR   16    NULL
  ```

- new Table „Fence" InnoDB with 4 Columns (additionally you may add an auto-incremented primary key column):
  ```
  HerdeID      VARCHAR   4
  Longitude    DECIMAL   9,6
  Latitude     DECIMAL   9,6
  Active       TINYINT              Default: 0
  ```

- new Table „Settings" InnoDB with 15 Columns (additionally you may add an auto-incremented primary key column):

```
HerdeID         VARCHAR 4
CyclesDay       INT 11          Default: 4
CyclesNight     INT 11          Default: 8
CycleLenDay     INT 11          Default: 15
CycleLenNight   INT 11          Default: 15
NightStartHour  INT 11          Default: 20
NightEndHour    INT 11          Default:6
DistAlarmThr    INT 11          Default:500
AccThreshold1   INT 11          Default:100
AccThr1AlarmCnt INT 11          Default:6000
AccThreshold2   INT 11          Default:200
AccThr2AlarmCnt INT 11          Default:6000
accNightFactor  INT 11          Default:1
TelNo1          VARCHAR 32
TelNo2          VARCHAR 32
```

- configure apache2 for web-frontend
  /etc/apache2/ports.conf: add ports for http and https / tls (I'm using 1080 for http and 1083 for https you may use other ports)

  ```
  >sudo nano /etc/apache2/apache2.conf
  ```
  (additionally to similar blocks) add:
  ```
  <Directory /opt/heidi/web/>
          Options Indexes FollowSymLinks
           AllowOverride None
           Require all granted
  </Directory>

  >sudo nano /etc/apache2/sites-available/heidi.conf
  <VirtualHost *:1080>
      ServerAdmin root@localhost
      DocumentRoot /opt/heidi/web
      ErrorLog ${APACHE_LOG_DIR}/error.log
      CustomLog ${APACHE_LOG_DIR}/access.log combined
  </VirtualHost>

  > sudo nano /etc/apache2/sites-available/heidi-ssl.conf
    <IfModule mod_ssl.c>
        <VirtualHost *:1083>
            ServerAdmin root@localhost
            DocumentRoot /opt/heidi/web

            ErrorLog ${APACHE_LOG_DIR}/error.log
            CustomLog ${APACHE_LOG_DIR}/access.log combined

            SSLEngine on
            SSLCertificateFile      /etc/ssl/certs/ssl-cert-snakeoil.pem
            SSLCertificateKeyFile /etc/ssl/private/ssl-cert-snakeoil.key

            <FilesMatch "\.(cgi|shtml|phtml|php)$">
                        SSLOptions +StdEnvVars
            </FilesMatch>
            <Directory /usr/lib/cgi-bin>
                        SSLOptions +StdEnvVars
            </Directory>

        </VirtualHost>
    </IfModule>
  ```
  (copy details from default-ssl.conf)

  ```
  > sudo a2ensite heidi.conf
  > sudo a2ensite heidi-ssl.conf
  > sudo a2enmod ssl
  > sudo systemctl restart apache2.service
  ```

- you may need to manually upgrade phpmyadmin, following: https://devanswers.co/manually-upgrade-phpmyadmin/

- Web-contend: upload all files from repository to /opt/heidi/web, enter /opt/heidi/web
  ```
  > wget https://github.com/openlayers/ol2/releases/download/release-2.13.1/OpenLayers-2.13.1.tar.gz
  > tar -xvzf OpenLayers-2.13.1.tar.gz
  > mv OpenLayers-2.13.1 ol
  > rm OpenLayers-2.13.1.tar.gz
  ```

- Configure your network according to the settings made here. If you not intend to use a commercial web-service, which maybe not a bad idea, you may use a fritz box DSL router because AVM provides a static URL for each device.

- that's it