CIVIS YouPower Platform Setup

Yilin Huang (y.huang@tudelft.nl)

August 2016

1 Introduction

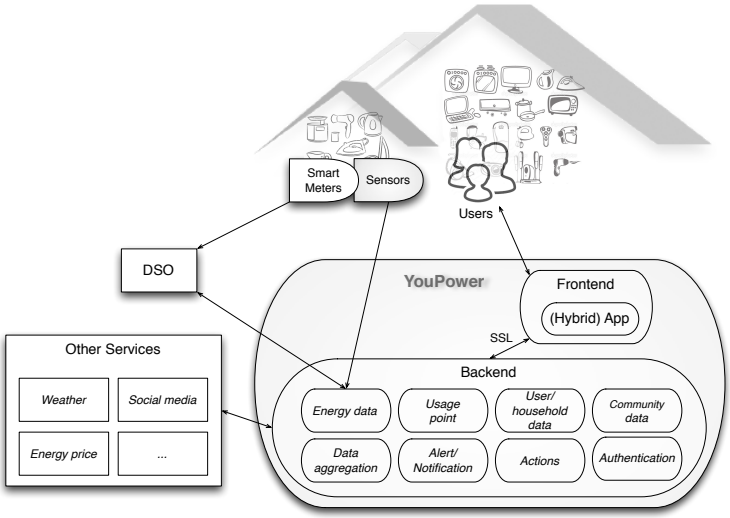
This document provides the information to set up the front-end and back-end of the YouPower Platform (https://app.civisproject.eu/) developed by the EU FP7 CIVIS project. The source code repository is at https://github.com/CIVIS-project/YouPower.

As shown in Figure 1, the CIVIS YouPower platform is composed of two parts: the services provided by the back-end, and the front-end application that users directly interact with. This document only focuses on the setup of the front-end application and the social level ICT services that are related to users/prosumers, households, communities, etc., and optionally energy prosumptions (if such data is available).

The setup of (hardware and software) system services that deal with the *collection* of energy data through the smart meters and sensors are not included in this document.

The YouPower software is open source and can be freely reused and modified under the Apache v.2 License[1].

[1] Free to use, distribute, modify, and to distribute modified versions of the software, under the terms of the license https://github.com/CIVIS-project/YouPower/blob/master/LICENSE.



DSO (Distribution System Operators), SSL (Secure Sockets Layer)

Figure 1: CIVIS platform overview

2 Package Management

A package management system (or simply a package manager) is a set of software tools that automates the installing, upgrading, configuring and removing software packages in an easy and comprehensive manner. The package management in YouPower development uses state of the art technologies as follows:

- Npm[2], a package manager for JS, and the default mackage manager for the JS runtime enviroment Node.js[3].

[2] https://www.npmjs.com/
[3] https://nodejs.org/

- Bower[4], a package manager for the front-end development to keep track of and update the packages.
- Gulp[5], a toolkit that helps to automate tasks in the development work-flow.

3 Localhost Setup for Development

A developer can set up and start a localhost as follows:

- First install Node.js[6], Npm[7], Gulp[8], GraphicsMagick[9] and MongoDB[10] on the local machine if any of those are not yet installed.
- Install Git[11] for version control.
- Clone/import the (front-end and back-end) source code from the GitHub repository[12] to the local machine. The source has a file structure as shown in Figure 2.
- Navigate to the project root directory *YouPower* (or another directory name chosen for the source location) on the local machine and install dependencies:

```
cd YouPower
npm install
```

[4] http://bower.io/
[5] http://gulpjs.com/
[6] https://nodejs.org/
[7] https://www.npmjs.com/
[8] http://gulpjs.com/
[9] http://www.graphicsmagick.org/
[10] https://www.mongodb.com/
[11] https://git-scm.com/
[12] https://github.com/CIVIS-project/YouPower

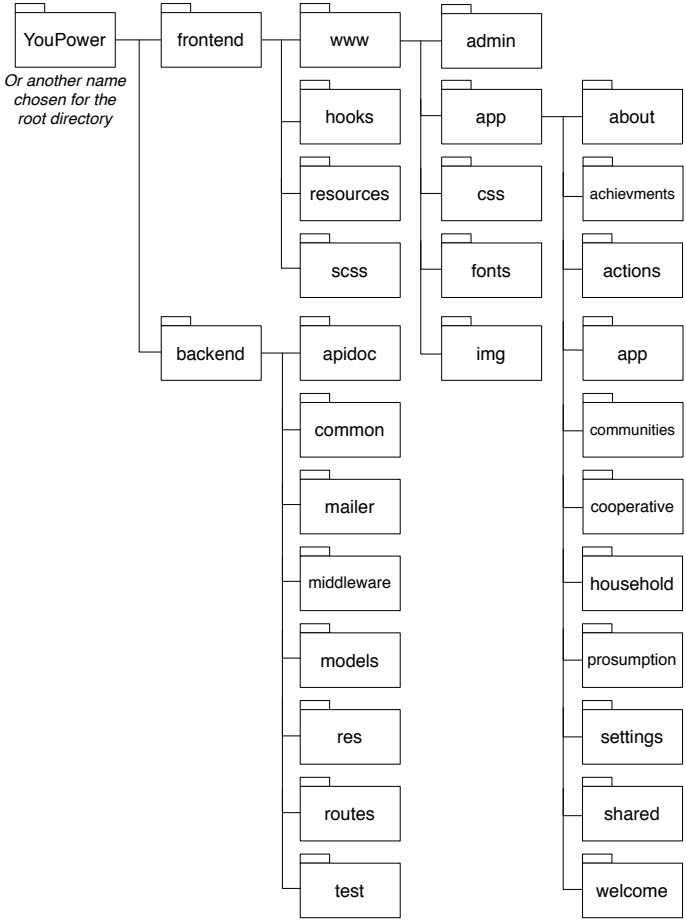


Figure 2: YouPower source code file structure

- Start MongoDB. The MongoDB installation and start process/-commands are different on Linux/OSx/Windows machines. Please refer to the MongoDB manual[13] for details.
- Start back-end server (1) with Npm start:

```
npm start
```

  or (2) with Gulp:

```
gulp
```

  When running the back-end with gulp, the back-end is restarted automatically each time when there is any change in `*.js` files.
- The REST API documentation is generated from inline code comments following the JSDoc specification[14]. The documentation web page is generated/updated with:

```
gulp apidoc
```

  The API documentation is then accessible at `http://localhost:3000`.
- Navigate to the front-end directory *YouPower/frontend*:

```
cd frontend
```

- Install, build and start front-end server:

```
npm install -g bower cordova ionic    // install
    tools for build
npm install        // install build dependencies
bower install      // install front-end dependencies
```

[13] https://docs.mongodb.com/manual/installation/#tutorials
[14] http://apidocjs.com/

```
gulp                        // build front-end
ionic serve                 // start front-end server
```

The front-end is then accessible at http://localhost:8100.

4 Production Server Setup

We use a Linux production server[15]. It uses *Nginx*[16] as the http and reservse proxy server. To set up Nginx, log on to the server machine and do the following steps:

- Install Nginx if not already installed:

```
sudo apt-get remove apache2   // remove the installed
    server, in our example it is apache
sudo apt-get install nginx
```

- Configure the reverse proxy rule by editing the file (e.g. on Debian/Ubuntu) :
  `/etc/nginx/sites-enabled/default`
  Add the following block in the file under the default `location / {...}` block:

```
location /api {
        proxy_pass     http://localhost:3000;
}
```

  This will proxy any requests beginning with `http://{hostname}/api` to the backend service running at port 3000. A similar block can be added for `location /apidoc` to expose the API documentation to the public.

[15] Currently hosted at http://civis.tbm.tudelft.nl
[16] https://nginx.org/en/

```
location /apidoc {
       proxy_pass     http://localhost:3000;
}
```

The configuration file of the server can be found at GitHub[17]. For more details about the configuration, refer to Nginx website[18].

- Change the root line in `/etc/nginx/sites-enabled/default` to the following:

```
root /var/www/html;
```

- Finally, restart the Nginx service to make all changes take effect:

```
sudo service nginx restart
```

Nginx should then show a default page, and should proxy API requests to the back-end.

To set up the YouPower back-end on the production server, you can do the following steps:

- Install the dependencies:

```
sudo apt-get install nodejs npm graphicsmagick git
    mongodb tmux
```

- Create a symbolic link to the Node location:

```
sudo ln -s /usr/bin/nodejs /usr/bin/node
```

[17] https://github.com/CIVIS-project/YouPower-configs/blob/master/etc/nginx/sites-enabled/default

[18] https://nginx.org/en/

- It is preferable to do the next steps as a unprivileged user. In the following, we will use username *YouPower* (and this user's home directory) where needed.

```
sudo su youpower    // change to the unprivileged user
cd                  // move to the home directory
```

- Clone the (front-end and back-end) source code from the GitHub repository to the home directory, and install the dependencies:

```
git clone https://github.com/CIVIS-project/YouPower/
cd ~/YouPower
npm install
```

Test running the back-end (it should stay running if everything works):

```
npm start
```

- To run the back-end as a Ubuntu update service, create a file (`/etc/init/youpower.conf`) as follows[19]:

```
description "YouPower backend"
author "CIVIS Project"

# When to start the service
start on runlevel [2345]

# When to stop the service
stop on runlevel [016]

# run as unprivileged user
setuid youpower
```

[19] https://github.com/CIVIS-project/YouPower-configs/blob/master/etc/init/youpower.conf

```
env HOME=/home/youpower
env FACEBOOK_APP_ID=<replaceme>
env FACEBOOK_APP_SECRET=<replaceme>
env FACEBOOK_CALLBACK_URL=<replaceme, e.g.
    https://app.civisproject.eu>

# Automatically restart process after crashed
respawn

# Start the process
exec /usr/bin/nodejs
    /home/youpower/YouPower/backend/app.js
```

Note: YouPower has Facebook login and share features which require permissions from Facebook. A registered application with *Facebook Developers*[20] obtains an App ID and an App Secret from Facebook, and can request for different types of permissions to access Facebook user data. This process is well documented on https://developers.facebook.com. If the Facebook features are used during development on the localhost, the App ID and an App Secret are needed by the localhost as well.

- Start the back-end with:

```
sudo service youpower start
```

- To update a running back-end instance:

```
sudo su youpower          // change to the youpower user
cd ~/YouPower             // make sure you are in the
    correct directory
git pull                  // update to the latest master
gulp apidoc               // update the apidocs
```

[20] https://developers.facebook.com

```
sudo service youpower restart    // restart the
    back-end
```

If the back-end doesn't start, find the upstart logs in:

```
sudo tail -n30 /var/log/upstart/youpower.log
```

To set up the YouPower front-end on the production server, you can do the following steps:

- Clone the source code from the GitHub repository to the home directory if it is not updated:

```
git clone https://github.com/CIVIS-project/YouPower/
```

- Navigate to the front-end directory, install and build the front-end:

```
cd ~/YouPower/frontend
sudo npm install -g bower cordova ionic gulp //
    install tools for build
npm install         //  install build dependencies
bower install       // install clientside dependencies
gulp                // build front-end
```

The built front-end should be in `~/YouPower/frontend/www`.

- Create a symlink to `index.html` called `frontend.html`:

```
cd ~/YouPower/frontend/www
ln -s index.html frontend.html
```

This is needed because there is already an `index.html` on the web server, serving a web page of the YouPower project. In the next

step, we configure Nginx to try the `frontend` directory as a fallback for missing files, and this wouldn't work if there are two `index.html` files.

- To make the `frontend` available to users, we configure Nginx to use this directory for missing files in the default path. Edit the file[21] `/etc/nginx/sites-enabled/default`: change the default location's configuration block `location / {...}` by replacing

```
try_files $uri $uri/ =404;
```

with

```
try_files $uri $uri/ @frontend;
```

and add a `@frontend` block which looks as follows (please change the root path according to where the `frontend` directory is located):

```
location @frontend {
        root /home/youpower/YouPower/frontend/www;
        try_files $uri $uri/ =404;
}
```

So we end up with:

```
location / {
        try_files $uri $uri/ @frontend;
}

location @frontend {
        root /home/youpower/YouPower/frontend/www;
        try_files $uri $uri/ =404;
}
```

[21] https://github.com/CIVIS-project/YouPower-configs/blob/master/etc/nginx/sites-enabled/default

- Restart Nginx server to reload the configuration:

```
sudo service nginx restart
```

- To update the front-end:

```
sudo su youpower          // change to the correct user
cd ~/YouPower/frontend
git pull
npm install          // install build dependencies
bower install        // install clientside dependencies
gulp                      // rebuild frontend
```

Please contact the CIVIS consortium partners should you need further information.