Raspberry Pi

- OS: Raspbian
- Raspbian Installation Guideline Energie AG (German) (Node Red not used)

Installing .NET

© https://edi.wang/post/2019/9/29/setup-net-core-30-runtime-and-sdk-on-raspberry-pi-4

- move to home directory
  - cd ~
- Download
  - wget https://download.visualstudio.microsoft.com/download/pr/349f13f0-400e-476c-ba10-fe284b35b932/44a5863469051c5cf103129f1423ddb8/dotnet-sdk-3.1.102-linux-arm.tar.gz
  - wget https://download.visualstudio.microsoft.com/download/pr/8ccacf09-e5eb-481b-a407-2398b08ac6ac/1cef921566cb9d1ca8c742c9c26a521c/aspnetcore-runtime-3.1.2-linux-arm.tar.gz
- Unpack Downloads
  - mkdir dotnet-arm32
  - tar zxf dotnet-sdk-3.1.102-linux-arm.tar.gz -C $HOME/dotnet-arm32
  - tar zxf aspnetcore-runtime-3.1.2-linux-arm.tar.gz -C $HOME/dotnet-arm32
- Environment Variables
  - nano ~/.bashrc
  - LD_LIBRARY_PATH=/usr/local/lib
  - export LD_LIBRARY_PATH
  - DOTNET_ROOT=$HOME/dotnet-arm32
  - export DOTNET_ROOT
  - PATH=$PATH:$HOME/dotnet-arm32
  - export PATH

Setup VPN

- DDNS
  - create account at noip.com
  - https://www.noip.com/support/knowledgebase/install-ip-duc-onto-raspberry-pi/
- VPN
  - https://pimylifeup.com/raspberry-pi-wireguard/
- Router
  - enable port forwarding
  - enable DDNS
- Smartphone
  - install WireGuard

Install C++ Library (slave) from Energie AG

Energie AG installation guide (German)

Use two .7z files in this folder: raspberry pi\Energie AG\Linux_CPP

Copy Backend onto Raspberry

Directory Structure

You must have the following directory structure in your folder {YOUR_FOLDER}. Otherwise, the backend will not work.

```
backend/
  ...
slave/
  mbus-slave-ima-cpp-webdemo/
     ...
```

- backend
  - unzipped backend

Startup

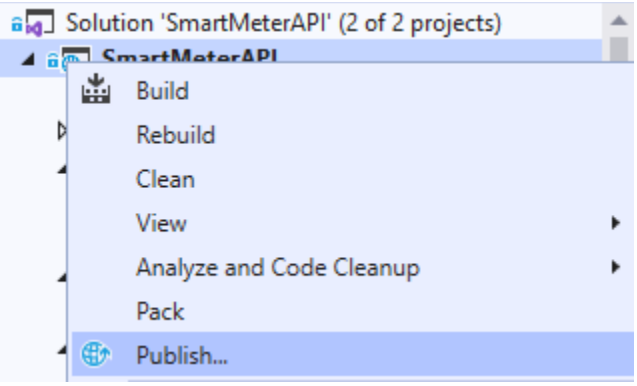
- start slave
  - cd {YOUR_FOLDER}/slave/mbus-slave-ima-cpp-webdemo
- start backend
  - cd ../../backend
  - dotnet SmartMeterAPI.dll --urls http://*:8080

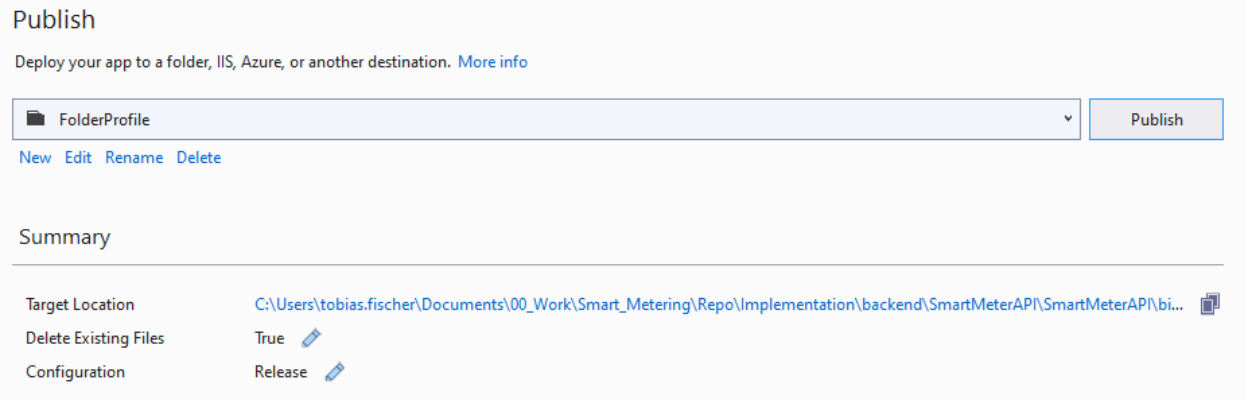
Backend

Download Visual Studio: https://visualstudio.microsoft.com/de/downloads/

Publish Solution

Right Click on SmartMeterAPI Project





Select a location and press publish. Copy the selected folder onto your raspberry's backend folder (zip would help). Attention: stop backend before

Android

Download Android Studio: https://developer.android.com/studio

- run on phone
    - install apk on your phone
    - run project with android studio (activate USB Debugging on your phone)

Continue Working …

Every Class/Method is documented with inline comments (XML Documentation in backend and Javadoc in android). Please make use of them.

The current project state is working with:

- Database
  - SQLite3 (locally stored)
  - database_amis_merged.db
- Backend
  - Entity Framework Core
    - database Connection
    - related project: SmartMeterApiDb
  - .NET Core
    - REST service
    - SmartMeterController, SmartMeterService
  - SignalR
    - Real Time
    - server pushing data to clients
    - SmartMeterHub, SmartMeterBackgroundService
  - data interface to frontend
    - / DTOs
- Android
  - UI
    - HistoryFragment, RealtimeFragment, SettingsFragment
  - backend communication
    - SignalRListener, VolleyRequest
  - MPAndroidChart
    - /chart {Axis Formatter}