How to implement Node-red flow heatdemand processing within Home Assistant.

The heat demand flow is able to decide if a heat demand for a boiler / heatpump is there by reading thermostat entities (actual vs. settemp) and using parameters to switch a heating circuit on/off depending on heatdemand.

The following technical prerequisites are needed:

1. Node-Red addon is installed and active.
2. MQTT Broker is installed and discovery prefix is set to standard "homeassistant"
3. additional "axios" module is configured within NR as additional npm package
4. Add axios function using the file editor to functionGlobalContext within settings.js
   And restart node-js addon. (the other functions are not needed) for heatdemand)

/addon_configs/a0d7b954_nodered/settings.js

```
148    // Anything in this hash is globally available to all functions.
149    // It is accessed as context.global.
150    // eg:
151    //    functionGlobalContext: { os:require('os') }
152    // can be accessed in a function block as:
153    //    context.global.os
154
155 ▼  functionGlobalContext: {
156      rijndael:require("rijndael-js"),
157      crypto:require("crypto"),
158      axios:require("axios"),
159      request:require("request"),
160      mysql2:require("mysql2/promise"),
161      // os:require('os'),
162    },
163
```

5. Generate a long term api access token in HA

With these prerequisites the km200 data processing flow consists of:
1. The Node-Red flow for heat demand:
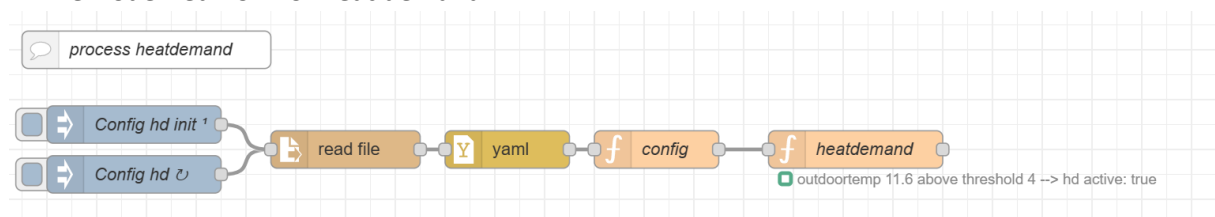
A configuration file hd.yaml has to exist in the config directory of HA.
The following entries within hd.yaml:

1. server local ha api access
2. the longterm access token generated
3. outdoor temp entity
4. outdoortemp_threshold: hd active if outdoortemp is above threshold
5. thermostats per room with entity, settemp and actualtemp
   deltam: defining minimum delta temp for heatdemand
   hc: heating circuit (hc1 to hc4)
   weight: weight of this thermostat
6. heatingcircuits
   hc: hc1 to hc4
   weigthon and weigthoff
   state: for mqtt write
   entity: entity within HA
   on /off: writing values for hc on/off (-1= auto ; 0 = off)
   savesettemp: saving previous settemp for floorheating when overwritten by 0 (off):
   true/false

Example hd.yaml:

```yaml
- server: http://localhost:8123/api/
- token: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

- outdoortemp_entity: sensor.boiler_outdoortemp
- outdoortemp_threshold: 4

- thermostats:

  - room: WZ
    entity: climate.wohnzimmer_thermostat
    settemp: temperature
    actualtemp: current_temperature
    deltam: 0.25
    hc: hc1
    weight: 3

  - room: WG
    entity: climate.wintergarten_thermostat
    settemp: temperature
    actualtemp: current_temperature
    deltam: 0.25
    hc: hc1
    weight: 3


- heatingcircuits:

  - hc: hc1
    weighton: 3
    weightoff: 2
    state: ems-esp/thermostat/hc1/tempautotemp
    entity: number.thermostat_hc1_tempautotemp
    on: -1
    off: 0
    savesettemp: false

  - hc: hc2
    weighton: 5
    weightoff: 0
    state: ems-esp/thermostat/hc2/tempautotemp
    entity: number.thermostat_hc2_tempautotemp
    on: -1
    off: 0
    savesettemp: true
```
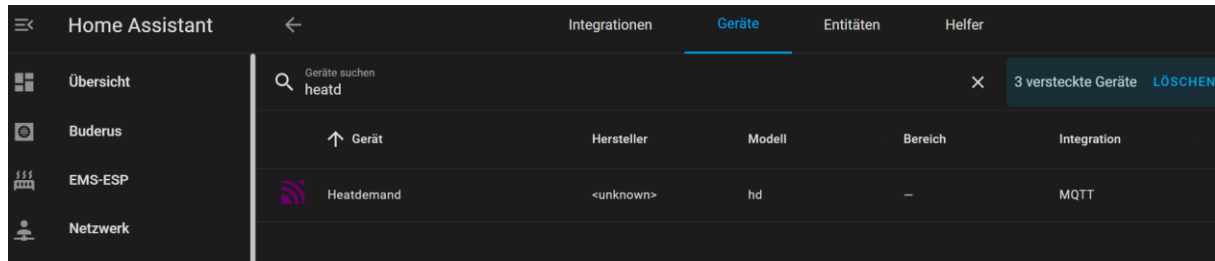
Flow Logic:

Once on Start the heat demand entities are created by using mqtt discovery api calls.

These entities are grouped under the device "Heatdemand" within mqtt integration:

Please note that entities are not automatically deleted when you change names. This has to be done using mqtt explorer or a similar tool.

The heatdemand logic is described by:

For each thermostat actualtemp is compared to settemp. If (settemp-actualtemp) > deltam then there is a heatdemand for this thermostat / climatate entity. The demand is given by the weight.

All demands for all thermostats of one heating circuit (hc1 to hc2) is aggregated and compared to the parameters of the heating circuit.
If sum(weigths) >= weigthon then hc will be switched on using the on value.
Otherwise the hc will be switched off using the value for off.

For floorheating the change of settemp to off will overwrite the former settemp.
For floorheating savesettemp could be be then set to true.
Then the former settemp will be stored and used for comparison of temperatures.

NR Flows:

The following flow can be copied and imported to node-red from file flownr.txt.

Please deactivate the flow until you have defined the hd.yaml file.