Intro

This manual describes how to setup a monitoring environment for the blackbird heatpump from the company Weheat. It uses the data published on the Weheat portal (https://portal.weheat.nl) and retrieves the data by using the java code created by zeekoe.

The script logs into the portal, keeps the connection open (preventing relogins for every new data retrieval), retrieves the data of the available parameters every 30 seconds and stores the data in an influx database. Grafana is used to show the data in a dashboard.

Example Grafana dashboard screenshots

Pre-requisites and systems/software used

1) Blackbird heatpump and access to the weheat portal
2) Maven software to compile the javacode
   https://maven.apache.org/install.html
3) Raspberry: To run the java code continuously, an always on system is needed.
4) Influx database: The data is stored by the java code in an influx database
   Download and install info can be found here: https://portal.influxdata.com/downloads/.
   In my case the influxdb is running as addon in home assistant.
5) Grafana dashboard: to visualize the data from the influx database
   Download and install info can be found here: https://grafana.com/get/?plcmt=top-nav&cta=downloads&tab=self-managed
   In my case Grafana is running as addon in home assistant.

Installation

It is assumed that the influxdb and grafana already have been setup. See Influx and Grafana documentation for the how-to**.**

Follow the next steps to setup the retrieval mechanism

1) Set the values in the config file
   bluebird.username=<portal username>
   bluebird.password=<portal password>
   bluebird.logurl=https://api.weheat.nl/api/v1/heat-pumps/<heatpump-code>/logs/latest

   influxdb.bluebird.database=<influx database name>
   influxdb.bluebird.measurement=<influx database name>
   influxdb.url=http://your-influx-server:8086
   influxdb.username=<influx user> (make sure the account has access to the specified database)
   influxdb.password=<influx password>

   The heatpump code can be found as follows:
   - Log in on the Weheat portal
   - Select your heatpump
   - In the browser header/url a number is displayed: https://portal.weheat.nl/nl/heat-pumps/<heatpumpcode> this is the code to be used in the bluebird.logurl

2) Compile the javacode to get an executable jar file. You might want to change the path of the config file as defined in the javacode (set in the files Influx.java and Auth.java)
   mvn clean install
   Make sure the bin directory of the maven install is defined in the path variable of your windows system
3) Copy the jar file and the config file on an 'always-on' system. In this description a raspberry is used. Make sure the (relative) directories are correct (as specified in the files : Auth.java and Influx.java).
4) Manually start the javascript:
5) java -jar bluebird-0.2-SNAPSHOT-jar-with-dependencies.jar (or whatever name the jar file was given).
   In this case the config file and the jar file are in the same directory.
   Heatpump data is now pushed to the influxdb every 30 seconds. Grafana dashboard can now be created according your own needs. <or import example dashboard>

Javascript as service
Instead or running the jar file manually it's more convenient to run it in the background (f.i. using byobu (https://www.byobu.org/) or running it as a service:
Create file heatpump.service in /lib/systemd/system:

```
[Unit]
Description=Weheat
After=multi-user.target

StartLimitIntervalSec=500
StartLimitBurst=5

[Service]
Type=simple
ExecStart=/usr/bin/java -jar <path>/bluebird-0.1-SNAPSHOT-jar-with-dependencies.jar
Restart=on-failure
RestartSec=35s

[Install]
WantedBy=multi-user.target
```

Explanation: You can let systemd auto-restart it in case it fails or is accidentally killed. The 'restart=on-failure' will react to anything that stops your daemon: a code exception, someone that does kill -9 <pid>, … as soon as your daemon stops, systemd will restart it in 35 seconds.
StartLimitIntervalSec and StartLimitBurst settings prevents a failing service from being restarted every 35 seconds. This will give it 5 attempts, if it still fails, systemd will stop trying to start the service.

(Note: if you change your systemd unit file, make sure to run systemctl daemon-reload to reload the changes.)

Make sure the file properties are correct
```
sudo chmod 644 /lib/systemd/system/heatpump.service
chmod +x <path>/bluebird-0.1-SNAPSHOT-jar-with-dependencies.jar
```

Reload and enable the service
```
sudo systemctl daemon-reload
sudo systemctl enable heatpump.service
sudo systemctl start heatpump.service
```

Check status
```
sudo systemctl status heatpump.service
```

Start service
```
sudo systemctl start heatpump.service
```

Stop service
```
sudo systemctl stop heatpump.service
```

Check service's log
```
sudo journalctl -f -u heatpump.service
```

Parameters

Java script	Weheat portal	Unit	Possible values	Short description
state	state	-	0, 40, 70, 90, ...	State of the heatpump; see values in table below
error	error	-	0-15	Error state of the heatpump; see values in table below
t_1	t_1	°C	?	Upper temperature sensor Boiler barrel
t_2	t_2	°C	?	Lower temperature sensor Boiler barrel
t_air_in	t_air_in	°C		Air temperature at the inlet of the heatpump evaporator
t_air_out	t_air_out	°C		Air temperature at the outlet of the heatpump evaporator
t_water_in	t_water_in	°C		Watertemperature at the inlet of the condensor.
t_water_out	t_water_out	°C		Watertemperature at the outlet of the condensor.
t_water_house_in	t_water_house_in	°C		Watertemperature in the control unit
t_compressor_in	t_comp_in	°C		Evaporator temperature at the inlet of the heatpump compressor.
t_compressor_in_transient	t_comp_in_trans	°C		Transition temperature of the refrigerant on the suction side of the compressor
t_compressor_out	t_comp_out	°C		Evaporator temperature at the heatpump compressor outlet.
t_compressor_out_transient	t_comp_out_trans	°C		Transition temperature of the refrigerant on the pressure side of the compressor.
t_room	t_room	°C		Temperature as transmitted by the thermostat in the 'active' room
t_room_target	t_room_target	°C		Target temperature of the thermostat in the 'active' room
t_thermostat_setpoint	t_thermostat_setpoint	°C	10-70	Requested water temperature by the thermostat. Max value can be set by the installer company.
t_inverter	t_inverter	°C		Temperature of the inverter
ot_boiler_feed_temperature	ot_boiler_feed_temperature	°C		Watertemperature at the inlet of the boiler (full electric).
ot_boiler_return_temperature	ot_boiler_return_temperature	°C		Watertemperature at the outlet of the boiler (full electric).
cop	cop	W/W	0-10	Efficiency of the heatpump. (coefficient of performance). Note: This value is calculated by using available parameters (cm_mass_power_out/ cm_mass_power_in), but can strongly deviate from the actual COP.
p_compressor_in	p_comp_out	bar		Compressor input pressure .
p_compressor_out	p_comp_in	bar		Compressor output pressure.
compressor_power_low_accuracy	comp_power_low_acc	W		Rough measurement of input electrical power.

cm_mass_power_in	cm_mass_power_in	kW		Measured used energie by heatpump (exchanger).
cm_mass_power_out	cm_mass_power_out	kW		Calculated value energy delivered by heatpump (exchanger).
cm_mass_flow	cm_mass_flow			Calculated refrigerant flow through the heatpump.
fan	fan	%	0-100	Requested rpm fan.
fan_power	fan_power	W	0-120	Measured used energy by fan.
rpm	c_rpm	rpm	0-4.500?	Fan rpm.
Parameters Currently not in java code				
	on_off_thermostat_state		0, 1?	On/Off thermostat status (1=heat demand, 0=no heat demand).
	dt_comp_in_superheat	?		Overheating refrigerant.
	gas_heater_cmd			Central heating boiler control.
	heatsink			Delivery system.
	valve	%		Expansion valve opening position

Heatpump State values

State	Meaning
1	initializing
10	initializing EXV
20	initializing ethernet
30	initializing inverter
32	initializing inverter ready
40	standby
70	running
80	defrost passive
84	defrost active
90	defrost bypass opening
100	defrost bypass closing
110	defrost drip
120	fan reverse
255	unknown

Heatpump Error values

Error	Meaning
0	OK
1	Compressor stop failed
2	Compressor RPM change failed
3	Compressor stopped for unknown reason
4	Input pressure to low
5	Output pressure to high
6	Defrost required
7	Compressor error set
8	Water in to high
9	Water out to high
10	Output temperature to high
11	Vat comm error
12	Compressor comm error
13	Fan comm error

14	Modbus comm error
15	Condensor freezing risk
default:	Unknown error