

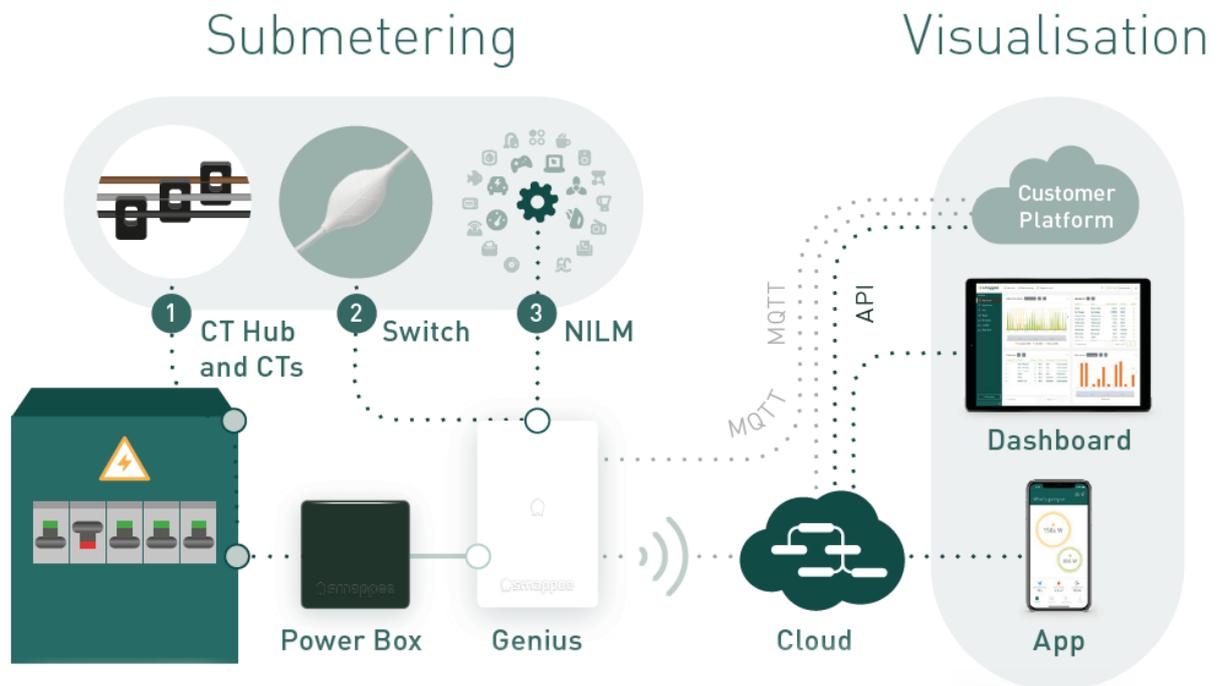
## Smappee API Documentation

### Overview

The Smappee API facilitates easy integration with other HEMS/BMS systems. This allows ESCOs and OEM customers to combine Smappee data with other data, creating added value for their business and their customers. Both API methods are described in this document.

The Smappee API supports 2 communication protocols:

1. REST API (polling principle – cloud to cloud communication): used to obtain historical data on demand.
2. MQTT (push-principle – device to local or cloud communication): used to acquire real time data automatically.



## 1. REST API

In this chapter you'll get a general description of the values that can be gathered using the Smappee REST API. Find the detailed overview here:

<https://smappee.atlassian.net/wiki/spaces/DEVAPI/overview>

### Overview of the Smappee API Methods

#### General

- 'Get Servicelocations': get an overview of all the Smappee monitors (locations) under a specific user account.
- 'Get Servicelocation Info': get detailed information about a specific location (Smappee monitor).

#### Measurement values

- 'Get Consumption': get measurement values of a Smappee monitor for a specified time range.
- 'Get Switch Consumption': get measurement values of a Smappee Switch.
- 'Get Sensor Consumption': get measurement values of a Smappee Gas & Water.

#### NILM

- 'Get Events': get an overview of the appliance events monitored by a Smappee monitor.
- 'Get Cost analysis': get energy consumption values per appliance during a specified time range.

#### Smart Plug

- 'Actuator ON and OFF': command to turn a Comfort Plug or a Smappee Switch that's connected to the Smappee monitor on or off.
- 'Actuator state': the current state of a Smappee Switch (on or off).

#### Location management

- 'Create service location'
- 'Delete service location'
- 'Update service location'
- 'Share access to a service location'

## Detailed description

### General

- 'Get Service locations': get a list of all the Smappee Monitors (locations) under a specific user account. Smappee can provide a special user name that contains all current and newly-installed monitors of your company.
- 'Get Service location Info': get the following detailed info of a Smappee monitor:
  - General information
    - Location name as specified by the user
    - Time zone
    - Physical Location (longitude, latitude) as specified by the user in the Smappee App.
    - Electricity tariff and currency
  - List of appliances recognised by the Smappee NILM Technology (general name added by the user and appliance type)
  - Actuators: list of names of the Comfort Plug(s) and Smappee Switch(es) connected to the Smappee monitor.
  - Sensors: overview of the Smappee Gas & Water(s) connected to the Smappee monitor.
  - Load Configuration: Overview of each measurement (CT) and its configuration:
    - Name
    - Phase
    - Input type (consumption, production, storage, submeter)
    - Reversed activation state (true, false)
    - NILM activation state (true, false)
    - Balanced activation state (true, false)
    - CT Type (50A, 200A, 400A...)

### Measurement values

- 'Get Consumption': get the electricity consumption and production values of electricity for a specified time range.

The following types of aggregation values are available:

- 5 min, 10 min, 15 min, 20 min and 30 min values (only available for the last 31 days)
- Hourly values
- Daily values
- Monthly values
- Quarterly values

The electricity consumption values that are available:

- Total (Active power) consumption
- Total production (solar)
- Always on
- Active & reactive power consumption per input (CT)
- Voltages per phase

- 'Get Switch Consumption': get the consumption values of a Smappee Switch connected to a Smappee monitor for a specific time range.

The following types of aggregation values are available:

- 5 min values (only available for the last 31 days)
- Hourly values
- Daily values
- Monthly values
- Quarterly values

- 'Get Sensor Consumption': get the setup and measurements values of the sensor (pulses) inputs of the Smappee Gas & Water connected to the Smappee monitor.

The following types of aggregation values are available:

- 5 min values (only available for the last 31 days)
- Hourly values
- Daily values
- Monthly values
- Quarterly values

The water or gas consumption values that are available:

- Timestamp (UTC stamp)
- Values of input 1
- Values of input 2
- Temperature (°Celsius multiplied by factor 10)
- Relative humidity (%)
- Battery level (%)

## NILM

- ‘Get Events’: get an overview of the appliance events detected by the Smappee monitor and get an overview of the (active) power per detected appliance:
  - Active power value (watts) as a result of the appliance event. Positive value in case the appliance is switched on (power increase of the appliance), negative value in case the appliance is switched off (power decrease of the appliance).
  - Total power (watts) after the event: this describes the total load of the complete installation. This value indicates the current status of the total load of the installation when appliance is switched on.
- ‘Get Cost Analysis’: get a breakdown of the energy consumption per appliance for a specified time range.

The following types of aggregation values are available:

- Monthly values
- Yearly values

## Smart Plug

- ‘Actuator ON/OFF’: ‘command to turn a Comfort Plug or Smappee Switch that’s connected to as Smappee monitor on or off. This can be done for a specific time range or permanently.

A Comfort Plug and Smappee Switch can be turned on for intervals of 300, 900, 1800 or 3600 seconds. Any other value results in turning on the Comfort Plug or Smappee Switch for an undetermined period of time.

- ‘Actuator State’: get the state of a Smappee Switch. The possible values are ‘On’ or ‘Off’.

## Service Location Management (advanced)

- Create service location: create a new service location.
- Delete service location: delete an existing service location.
- Update service location: update an existing service location.
  - Name
  - Geo location: longitude and latitude
- Share access to a service location.

Note: all of the listed actions require a special user account provided by Smappee.

## 2. MQTT

In this chapter you'll get a general and detailed description on how to use the MQTT functionality of the Smappee monitor.

### MQTT Technology

“MQTT is a Machine-to-Machine (M2M)/Internet of Things connectivity protocol. It was designed as an extremely lightweight publish/subscribe messaging transport. It is useful for connections with remote locations where a small code footprint is required and/or network bandwidth is at a premium.” (“What is MQTT”, n.d.)

Source: What is MQTT. (n.d.). retrieved from <http://mqtt.org/>

### General

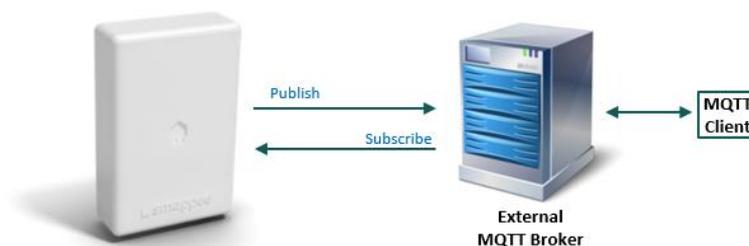
The Smappee Infinity sends out MQTT Topics that can be picked up by an external MQTT broker or by a broker in the local network. The Smappee Infinity monitoring system is also equipped with a local MQTT broker.

### Principle

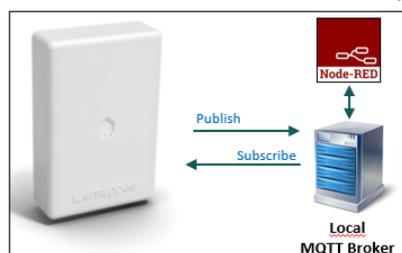
- The Smappee device constantly pushes MQTT-data (topics).
- The server which is equipped with an MQTT broker, is ‘subscribed’ to a set of the Smappee data and redirects the data to a specified location or platform.
- The server hosting the MQTT broker can be located in the local network, cloud or other server.

### Application

1. Data exchange via an external MQTT broker (most frequently used).



2. Node Red via local MQTT broker embedded in the Smappee Genius.



## Smappee MQTT Topics Overview

The MQTT details are listed further in the document.

Note:

- uuid: the unique identifier of the service location
- node id: the unique identifier of the plug

Data holder	Topic & message content
Configuration	<ul style="list-style-type: none"> <li>• Config: contains the meta data of the service location (serial number, owner, language, NILM version...)</li> <li>• Channel Config: contains the meta data of CT inputs (name, load type, CT Type, Phase, reversed...)</li> <li>• Sensor Config: contains the meta data of the Smappee Gas &amp; Water linked to the gateway.</li> <li>• Home Control Config: contains the meta data of the connected Smappee Switch units linked to the gateway.</li> </ul>
Realtime energy data (1-second data)	Contains real-time data of all active [W], reactive power [Var], current [dA] and voltage [V] measurements. Published every second.
Aggregated 5-minute values	Contains the consumption values aggregated per 5 minutes: <ul style="list-style-type: none"> <li>• Energy data: for each input (current [dA], active [P], reactive power [var], apparent power [VA] power factor), voltage, consumption, solar.</li> <li>• Smappee Switch: active and reactive power [W]</li> <li>• Smappee Gas &amp; Water: pulses, temperature, humidity, battery level</li> </ul>
Smappee Switch state	<ul style="list-style-type: none"> <li>• Connection state of Smappee Switch with gateway</li> <li>• Relay state: on/off with timestamp</li> <li>• Set state: set relay state</li> <li>• Trigger: reports trigger action by a 'Automation' created in the Smappee App.</li> <li>• Scheduler: reports the schedule(s) setup by a 'Automations' created in the Smappee App.</li> </ul>
Presence reporting	Reports if Smappee detected presence based on action consumption.

## How to obtain the UUID?

The Service location UUID can be obtained in the following ways:

1. Smappee Dashboard: <https://dashboard.smappee.net> (Location configuration card):

Property	Value
ID	11899
UUID	d578830e-7d3c-4221-9ad5-2c8866b0c5ef

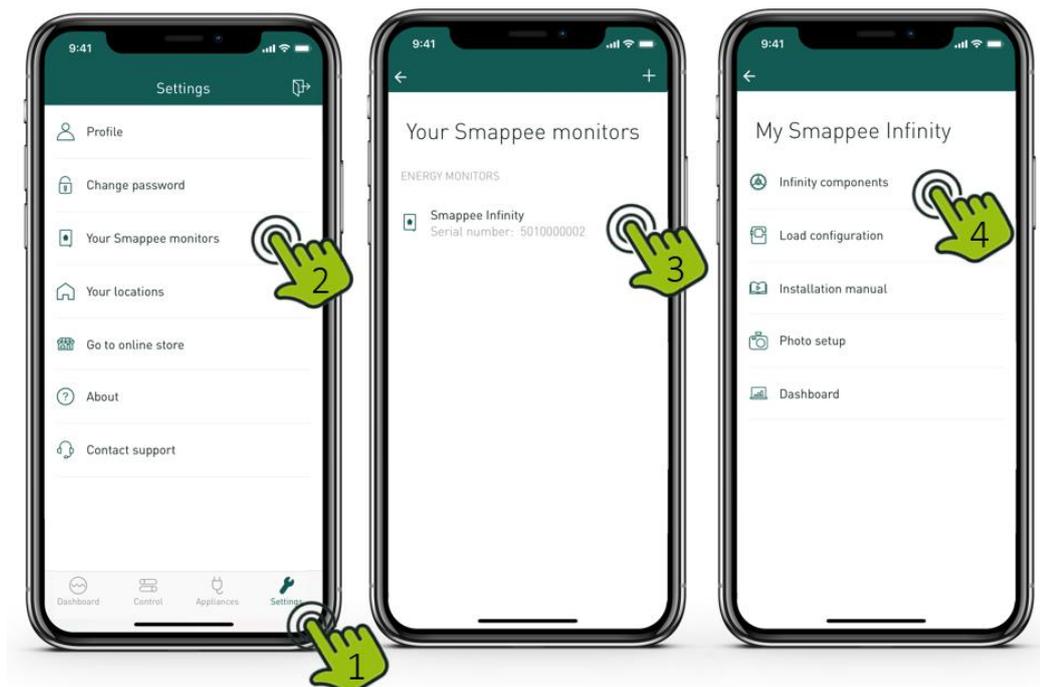
2. One-time REST API call:  
<https://smappee.atlassian.net/wiki/spaces/DEVAPI/pages/526483487/Get+Service+locations>
3. Wildcard as UUID: use a MQTT wildcard as UUID and based on the Configuration Topic results, match it to the serial number you need.  
(<https://www.hivemq.com/blog/mqtt-essentials-part-5-mqtt-topics-best-practices>)

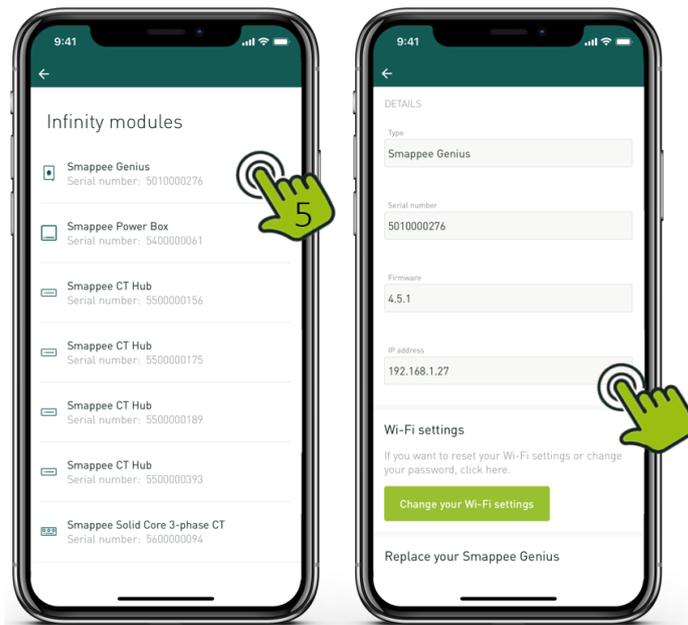
## Setup Smappee monitor

The MQTT-Broker location is set up on the Smappee monitor using the Expert Portal. Follow these steps:

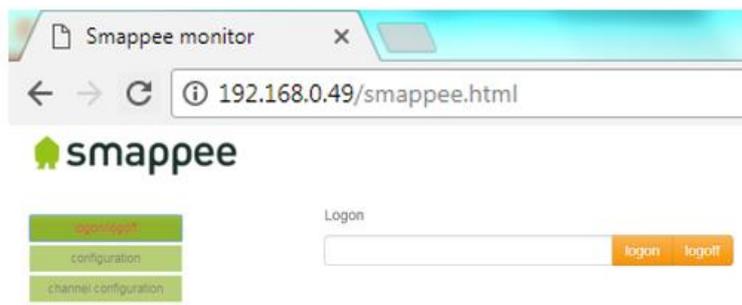
1. Log in to the Expert Portal of the Smappee monitor: determine the IP-address of the Smappee monitor in the Smappee App. Go to Settings > Your Smappee monitors > Smappee Infinity > Infinity Components > Smappee Genius.

**Note:** The tablet or laptop needs to be connected to the same network as the Smappee monitor to be able to use the Expert Portal.

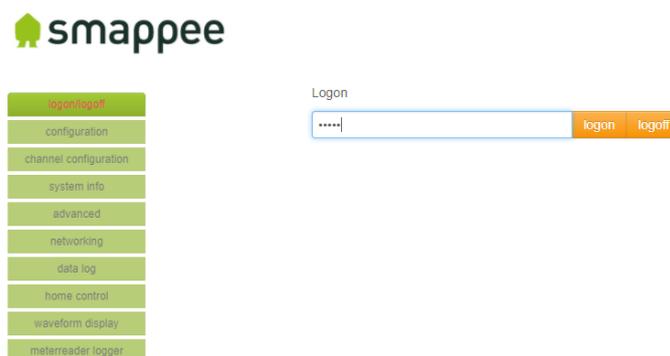




- Fill in the URL mentioned in your web browser: <http://<IP-address>/smappee.html>



- Click on 'Logon/logoff' and fill in password 'admin' and click on 'logon'.



- Click on 'Advanced'.

5. Fill in the location of the external MQTT Broker with either an IP-address or domain and authentication (if applicable).

Advanced config parameters	Setting	
Webportal password	<input type="text" value="admin"/>	
Active power lower limit (color green->yellow)	<input type="text" value="0"/>	W (0=off)
Active power upper limit (color yellow->orange)	<input type="text" value="0"/>	W (0=off)
Meter reader logging	<input type="text" value="0"/>	nr of 5 second entries (0=disabled) (1h/file)
MQTT local broker url (e.g. tcp://192.168.0.48:1883)	<input type="text" value="tcp://localhost:1883"/>	
MQTT local broker username	<input type="text"/>	
MQTT local broker password	<input type="text"/>	

6. To save the settings, click 'Apply changes and restart monitor'.

## MQTT Topics Details

Get an overview of the detailed documentation on the different MQTT topics per data holder type:

- uuid: the unique identifier of the service location
- node id: the unique identifier of the plug

## Configuration

Topic name	Description	Retained	Example content
servicelocation/ <uuid>/config	Contains the meta information of the service location as key/value pairs	true	<pre>{   "utcTimeStamp":1516351781376,   "deviceUuid":"c82b8446-3457-407a-82f4-9e1d78e94e34",   "serialNumber":"2004000025",   "serviceLocationUuid":"a02e00de-b589-11e7-bebe-0221c2cd44f5",   "serviceLocationId":555,   "firmwareVersion":"V3125",   "aggregationPeriodSeconds":300, }</pre>
servicelocation/ <uuid>/channel Config		true	<pre>{   "utcTimeStamp":1516351942839,   "inputChannels":[     {       "ctInput":0,       "name":"load1",       "phase":0,       "inputChannelType":"CONSUMPTION",       "inputChannelConnection":"GRID",       "reversed":false,       "nilm":false,       "balanced":false,       "inputChannelCTType":"CT50_100_200"     },     {       "ctInput":1,       "name":"load2",       "phase":0,       "inputChannelType":"CONSUMPTION",       "inputChannelConnection":"SUBMETER"     },     {       "reversed":true, </pre>

			<pre>"nilm":false, "balanced":false, "inputChannelCTType":"CT50_100_200" }, { "ctInput":2, "name":"load3", "phase":0, "inputChannelType":"UNUSED", "inputChannelConnection":"OFF_GRID", "reversed":false, "nilm":false, "balanced":false, "inputChannelCTType":"CT50_100_200" }, { "ctInput":3, "name":"solar1", "phase":0, "inputChannelType":"UNUSED", "inputChannelConnection":"OFF_GRID", "reversed":false, "nilm":false, "balanced":false, "inputChannelCTType":"CT50_100_200" }, { "ctInput":4, "name":"solar2", "phase":0, "inputChannelType":"UNUSED", "inputChannelConnection":"OFF_GRID", "reversed":true, "nilm":false, "balanced":false, "inputChannelCTType":"CT50_100_200" }, { "ctInput":5, "name":"solar3", "phase":0, "inputChannelType":"UNUSED", "inputChannelConnection":"OFF_GRID",</pre>
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			<pre> "reversed":true, "nilm":false, "balanced":false, "inputChannelCTType":"CT50_100_200" }, {   "ctInput":6,   "name":"test3",   "phase":0,   "inputChannelType":"UNUSED",   "inputChannelConnection":"GRID",   "reversed":false,   "nilm":false,   "balanced":false,   "inputChannelCTType":"CT50_100_200" } </pre>
<p>servicelocation/ &lt;uuid&gt;/sensorC onfig</p>		true	<pre> {   "utcTimeStamp":1516355153244,   "gwSensors":[     {       "gwSensorChannelsConfig":[         {           "leakIntervals":2,             "maxPulses":150,             "ppu":1.0,             "uom":"l",             "enabled":true,             "type":"WATER"         },         {           "leakIntervals":0,             "maxPulses":5,             "ppu":1.0,             "uom":"m3",             "enabled":false,             "type":"GAS"         }       ]     },     "sensorId":175,     "serialNumber":"3004001483"   ],   "switchSensors":[ </pre>

			<pre> {   "name": "Nieuwe plug 1",   "serialNumber": "4004000101",   "sensorId": 173 }, {   "name": "TestAndre",   "serialNumber": "4006999999",   "sensorId": 174 } ] } </pre>
<p>servicelocation/ &lt;uuid&gt;/homeControlConfig</p>		true	<pre> {   "utcTimeStamp": 1516351781394,   "switchActuators": [     {       "nodeId": 42,       "name": "Nieuwe plug 1",       "serialNumber": "4004000101"     },     {       "nodeId": 43,       "name": "TestAndre",       "serialNumber": "4006999999"     }   ],   "smartplugActuators": [     {       "nodeId": 50,       "name": "Nieuwe plug 3"     }   ] } </pre>

### Real-time energy data (1-second data)

Topic name	Description	Retained	Example content
servicelocation/ <uuid>/realtime	<p>Contains the real-time power values. Note that this information is published every second.</p> <p>Where:</p> <ul style="list-style-type: none"> <li>- Power in W (watt)</li> <li>- Energy in J (joule, Ws) (not persisted, reset to 0 on every software restart)</li> <li>- Voltage in V (volt)</li> <li>- Current in dA (deciampère)</li> <li>- Totals are the aggregated values taken into account the channel configuration</li> </ul>	false	<pre> {   "totalPower":98,   "totalReactivePower":116,   "totalExportEnergy":0,   "totalImportEnergy":344037,   "monitorStatus":0,   "utcTimeStamp":1516355206580,   "channelPowers":[     {       "ctInput":0,       "power":98,       "exportEnergy":0,       "importEnergy":344037,       "phaseId":0,       "current":7     },     {       "ctInput":1,       "power":99,       "exportEnergy":0,       "importEnergy":346027,       "phaseId":0,       "current":7     }   ],   "voltages":[     {       "voltage":207,       "phaseId":0     },     {       "voltage":0,       "phaseId":1     },     {       "voltage":0,       "phaseId":2     }   ] }           </pre>

			}
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### Aggregated 5-minute values

Topic name	Description	Retained	Example content
servicelocation/ <uuid>/aggregated	Contains the consumption values aggregated per 5 minutes. Note that this information is published every 5 minutes.	false	<pre>{   "intervalDatas":[     {       "utcEndtime":1516632600000,       "averageRMSVoltages":[         2231,         0,         0       ],       "alwaysOn":78702,       "channelIntervalDatas":[         {           "averageRMSCurrent":673,           "averageImportRMSActivePower":10 0513,           "averageExportRMSActivePower":0,           "averageRMSApparentPower":15059 7,           "averageRMSReactivePower":111867 ,           "averagePowerfactor":65,           "ctInput":0         },         {           "averageRMSCurrent":675,           "averageImportRMSActivePower":10 1089,           "averageExportRMSActivePower":0,           "averageRMSApparentPower":15096 2,           "averageRMSReactivePower":111832 ,           "averagePowerfactor":65,           "ctInput":1         },         {           "averageRMSCurrent":0,</pre>

			<pre>"averageImportRMSActivePower":0, "averageExportRMSActivePower":0, "averageRMSApparentPower":0, "averageRMSReactivePower":0, "averagePowerfactor":0, "ctInput":2 }, { "averageRMSCurrent":0, "averageImportRMSActivePower":0, "averageExportRMSActivePower":0, "averageRMSApparentPower":0, "averageRMSReactivePower":0, "averagePowerfactor":0, "ctInput":3 }, { "averageRMSCurrent":0, "averageImportRMSActivePower":0, "averageExportRMSActivePower":0, "averageRMSApparentPower":0, "averageRMSReactivePower":0, "averagePowerfactor":0, "ctInput":4 }, { "averageRMSCurrent":0, "averageImportRMSActivePower":0, "averageExportRMSActivePower":0, "averageRMSApparentPower":0, "averageRMSReactivePower":0, "averagePowerfactor":0, "ctInput":5 }, { "averageRMSCurrent":0, "averageImportRMSActivePower":0, "averageExportRMSActivePower":0, "averageRMSApparentPower":0, "averageRMSReactivePower":0, "averagePowerfactor":0, "ctInput":6 }, }</pre>
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			<pre> {   "averageRMSCurrent":0,   "averageImportRMSActivePower":0,   "averageExportRMSActivePower":0,   "averageRMSApparentPower":0,   "averageRMSReactivePower":0,   "averagePowerfactor":0,   "ctInput":7 }, {   "averageRMSCurrent":0,   "averageImportRMSActivePower":0,   "averageExportRMSActivePower":0,   "averageRMSApparentPower":0,   "averageRMSReactivePower":0,   "averagePowerfactor":0,   "ctInput":8 } ], "version":2 } ] } </pre>
<p>servicelocation/ &lt;uuid&gt;/aggregatedSwitch</p>	<p>Contains the consumption values aggregated per 5 minutes. Note that this information is published every 5 minutes.</p>		<pre> {   "switchIntervalDatas":[     {       "utcEndtime":1516632600000,       "activePower":0,       "reactivePower":0,       "version":1,       "sensorId":173     }   ] } </pre>
<p>servicelocation/ &lt;uuid&gt;/aggregatedGW</p>	<p>Contains the consumption values aggregated per 5 minutes. Note that this information is published on the 5 minutes boundary</p>		<pre> {   "gwIntervalDatas":[     {       "utcEndtime":1516632900000,       "sensorId":175,       "index0Delta":2,       "index1Delta":0,       "temperature":246, </pre>

	only if there was consumption during that 5-minute period.		<pre> "humidity":45, "battLevel":67, "version":1     }   ] }</pre>
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### Smappee Switch state

Topic name	Description	Retained	Example content
servicelocation/ <uuid>/plug/<n ode id>/connectionS tate	Contains an indicator that the specified plug at the Smappee monitor that is linked to the service location, is connected (1), disconnected (0), or unreachable (2) and the timestamp on which the switch to that state occurred. The timestamp is the number of milliseconds that have passed since Jan 1st, 1970 (UTC).	true	<pre> {   "value":"CONNECTED",   "since":1516355163247 } {   "value":"DISCONNECTED",   "since":1516355163247 } {   "value":"UNREACHABLE",   "since":1516355163247 }</pre>
servicelocation/ <uuid>/plug/<n ode id>/state	Contains an indicator that the specified plug at the smappee monitor that is activated on the specified service location, is switched on or off and the timestamp on which the switch to that state occurred. The timestamp is the number of milliseconds that have passed since Jan	true	<pre> {   "value": "ON",   "since": 1505479692000 } {   "value": "OFF",   "since": 1505479692000 }</pre>

	1st, 1970 (UTC).		
servicelocation/ <uuid>/plug/<n ode id>/setstate	Sets the state 'On' or 'Off' on the specified plug at the smappee monitor that is activated on the specified service location.	true	<pre>{   "value": "ON",   "since": 1505479692000 } {   "value": "OFF",   "since": 1505479692000 }</pre>
servicelocation/ <uuid>/trigger	<p>Reports a trigger action</p> <ul style="list-style-type: none"> <li>- triggerId assigned by backend during configuration</li> <li>- controllableNodes may be empty or uses nodeId from homeControlconfig</li> <li>- all other values according to the configuration of the trigger</li> <li>- Not all values are used for specific trigger types</li> </ul>	true	<pre>{   "triggerId": 3,   "label": "Nieuwe Trigger 3",   "controllableNodeIds": [2],   "type": "ACTIVE_POWER_ABOVE",   "longitude": 0.0,   "latitude": 0.0,   "radius": 0,   "delay": 0,   "action": "ON",   "threshold": 100.0 }</pre>
servicelocation/ <uuid>/scheduler	<p>Reports a scheduler action</p> <ul style="list-style-type: none"> <li>- schedulerId assigned by backend during configuration</li> <li>- controllableNodes may be empty or uses nodeId from homeControlconfig</li> <li>- all other values according to the configuration of the trigger</li> </ul>		<pre>{   "schedulerId": 2,   "label": "Nieuwe Trigger off",   "controllableNodeIds": [],   "hour": 9,   "min": 10,   "day": "ALL_DAYS",   "action": "OFF" }</pre>

## Presence reporting

Topic name	Description	Retained	Example content
servicelocation/ <uuid>/presence	Contains a flag that indicates if the Smappee monitor that is activated on the service location detected presence based on the actual consumption.	true	{ "value": true }