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# HABApp Documentation

*Release beta*

**spacemanspiff2007**

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# USER DOCUMENTATION

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## INSTALLATION & USAGE

### 1.1 Virtual environment

#### 1.1.1 Installation

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**Hint:**

With openhabian the complete installation can be performed through the openhabian-config tool (option 2B). HABApp will be installed into `/opt/habapp`, so it is the same as the installation described here.

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**Hint:** On Windows use the `python` command instead of `python3`

---

1. Navigate to the folder where the virtual environment shall be created (e.g.):

```
cd /opt
```

2. Create virtual environment (this will create a new folder “habapp”):

```
python3 -m venv habapp
```

3. Go into folder of virtual environment:

```
cd habapp
```

4. Activate the virtual environment

Linux:

```
source bin/activate
```

Windows:

```
Scripts\activate
```

5. Upgrade pip and setuptools:

```
python3 -m pip install --upgrade pip setuptools
```

6. Install HABApp:

```
python3 -m pip install habapp
```

### 7. Run HABApp:

```
habapp --config PATH_TO_CONFIGURATION_FOLDER
```

A good configuration folder for HABApp would be your openHAB configuration folder (e.g. `/opt/openhab/conf/habapp` or `/etc/openhab/habapp`) because this is where your other configuration folders are located (e.g. the items and sitemaps folder). Just make sure to manually create the folder `habapp` before the start.

---

**Hint:** After the installation take a look how to configure HABApp. A default configuration will be created on the first start.

---

## 1.1.2 Upgrade to the latest version

1. Stop HABApp
2. Activate the virtual environment

Navigate to the folder where HABApp is installed:

```
cd /opt/habapp
```

Activate the virtual environment

Linux:

```
source bin/activate
```

Windows:

```
Scripts\activate
```

3. Run the following command in your activated virtual environment:

```
python3 -m pip install --upgrade habapp
```

4. Start HABApp
5. Observe the logs for errors in case there were changes

## 1.1.3 Installation of a certain version

Installing a certain version of HABApp requires the same steps used for installation or upgrading HABApp. However the final `python3 -m pip install` command is now different and contains the version number:

```
python3 -m pip install HABApp==23.12.0
```

The complete list of available versions can be found on [pypi](https://pypi.org/project/HABApp/).



### 1.1.4 Autostart after reboot

Check where habapp is installed:

```
which habapp
```

To automatically start HABApp from the virtual environment after a reboot call:

```
nano /etc/systemd/system/habapp.service
```

and copy paste the following contents. If the user which is running openHAB is not “openhab” replace accordingly. If your installation is not done in “/opt/habapp/bin” replace accordingly as well:

```
[Unit]
Description=HABApp
Documentation=https://habapp.readthedocs.io
After=network-online.target

[Service]
Type=simple
User=openhab
Group=openhab
UMask=002
ExecStart=/opt/habapp/bin/habapp -c PATH_TO_CONFIGURATION_FOLDER

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

Press Ctrl + x to save.

Now execute the following commands to enable autostart:

```
sudo systemctl --system daemon-reload
sudo systemctl enable habapp.service
```

It is now possible to start, stop, restart and check the status of HABApp with:

```
sudo systemctl start habapp.service
sudo systemctl stop habapp.service
sudo systemctl restart habapp.service
sudo systemctl status habapp.service
```

### 1.1.5 Error message while installing ujson

Under windows the installation of ujson may throw the following error but the download link is not working. Several working alternatives can be found [here](#).

```
Running setup.py install for ujson ... error
ERROR: Complete output from command 'C:\Users\User\Desktop\HABApp\habapp\Scripts\
python.exe' -u -c 'import setuptools, tokenize;__file__='\"C:\\Users\\User\\AppData\\
Local\\Temp\\pip-install-4y0tobjp\\ujson\\setup.py\"';f=getattr(tokenize, '\"open\"'
 '\"', open)(__file__);code=f.read().replace('\"\\r\\n\"', '\"\\n\"');f.close();
exec(compile(code, __file__, '\"exec\"'))' install --record 'C:\Users\User\AppData\
```

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```
↪ Local\Temp\pip-record-6t2yo712\install-record.txt' --single-version-externally-managed_
↪ --compile --install-headers 'C:\Users\User\Desktop\HABapp\habapp\include\site\python3.
↪ 7\ujson':
ERROR: Warning: 'classifiers' should be a list, got type 'filter'
running install
running build
running build_ext
building 'ujson' extension
error: Microsoft Visual C++ 14.0 is required. Get it with "Microsoft Visual C++ Build_
↪ Tools": https://visualstudio.microsoft.com/downloads/
-----
```

## 1.1.6 Error message while installing ruamel.yaml

```
_ruamel_yaml.c:4:10: fatal error: Python.h: No such file or directory
```

Run the following command to fix it:

```
sudo apt install python3-dev
```

## 1.2 Docker

### 1.2.1 Image installation

Installation through [docker](#) is available:

```
docker pull spacemanspiff2007/habapp:latest
```

The image supports the following environment variables.

Variable	Description
TZ	Timezone used for the container (e.g. Europe/Berlin).
USER_ID	User id at which HABApp will run (Optional, default: 9001)
GROUP_ID	Group id at which HABApp will run (Optional, default: USER_ID)
HABAPP_HOME	Directory in which the config resides (in subdirectory “config”) default: habapp)

### 1.2.2 Running image from command line

```
docker run --rm -it --name habapp \
-v ${PWD}/habapp_config:/habapp/config \
-e TZ=Europe/Berlin \
-e USER_ID=9001 \
-e GROUP_ID=9001 \
spacemanspiff2007/habapp:latest
```

Parameters explained

Parameter	Description
<code>--rm</code>	Remove container when stopped
<code>-it</code>	Run in interactive mode (Optional) -> You can stop HABApp by pressing STRG+C and see stdout
<code>--name habapp</code>	Give the container an unique name to interact with it
<code>-e TZ=Europe/Berlin</code>	Set environment variable with timezone
<code>-e USER_ID=9001</code>	Set environment variable with wser id at which HABApp will run (Optional, default: 9001)
<code>-e GROUP_ID=9001</code>	Set environment variable with group id at which HABApp will run (Optional, default: USER_ID)
<code>spacemanspiff2007/habapp:latest</code>	Name of the image that will be run

### 1.2.3 Updating image from command line

```
docker stop habapp

docker pull spacemanspiff2007/habapp:latest
```

### 1.2.4 Updating image on Synology

To update your HABApp docker within Synology NAS, you just have to do the following:

On the Synology NAS just select “Download” with tag “latest” to download the new image. It will overwrite the old one on the NAS. Then stop the container. After selecting “Action” -> “Clear” on the HABApp container, the container is there, but without any content. After starting the container again, everything should immediately work again.

### 1.2.5 Additional python libraries

If you want to use some additional python libraries you can do this by writing your own Dockerfile using this image as base image. The HABApp image is based on the python-slim image so you can install packages by using apt and pip.

Example Dockerfile installing scipy, pandas and numpy libraries:

```
FROM spacemanspiff2007/habapp:latest as buildimage

RUN set -eux; \
# Install required build dependencies (Optional)
  apt-get update; \
  DEBIAN_FRONTEND=noninteractive apt-get install --no-install-recommends -y \
    build-essential; \
# Prepare python packages
  pip3 wheel \
    --wheel-dir=/root/wheels \
    # Replace 'scipy pandas numpy' with your libraries
    scipy pandas numpy

FROM spacemanspiff2007/habapp:latest
```

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```

COPY --from=buildimage /root/wheels /root/wheels

RUN set -eux; \
# Install required runtime dependencies (Optional)
    apt-get update; \
    DEBIAN_FRONTEND=noninteractive apt-get install --no-install-recommends -y \
        bash; \
    apt-get clean; \
    rm -rf /var/lib/apt/lists/*; \
# Install python packages and cleanup
    pip3 install \
        --no-index \
        --find-links=/root/wheels \
        # Replace 'scipy pandas numpy' with your libraries
        scipy pandas numpy; \
    rm -rf /root/wheels

```

Build image

```
docker build -t my_habapp_extended:latest .
```

Start image (same as with provided image but the image name is different).

```

docker run --rm -it --name habapp \
    -v ${PWD}/habapp_config:/habapp/config \
    -e TZ=Europe/Berlin \
    -e USER_ID=9001 \
    -e GROUP_ID=9001 \
    my_habapp_extended:latest

```

## 1.3 Upgrading to a newer version of HABApp

It is recommended to upgrade the installation on another machine. Configure your production instance in the configuration and set the `listen_only` switch(es) in the configuration to `True`. Observe the logs for any errors. This way if there were any breaking changes rules can easily be fixed before problems occur on the running installation.

## 1.4 Command line arguments

Execute `habapp` with “-h” to view possible command line arguments

```
habapp -h
```

```
usage: -c [-h] [-c CONFIG] [-wos WAIT_OS_UPTIME] [-b] [-di]
```

Start HABApp

options:

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```

-h, --help            show this help message and exit
-c CONFIG, --config CONFIG
                        Path to configuration folder (where the config.yml is
                        located)
-wos WAIT_OS_UPTIME, --wait_os_uptime WAIT_OS_UPTIME
                        Waits for the specified os uptime before starting
                        HABApp
-b, --benchmark        Do a Benchmark based on the current config
-di, --debug-info      Print debug information

```

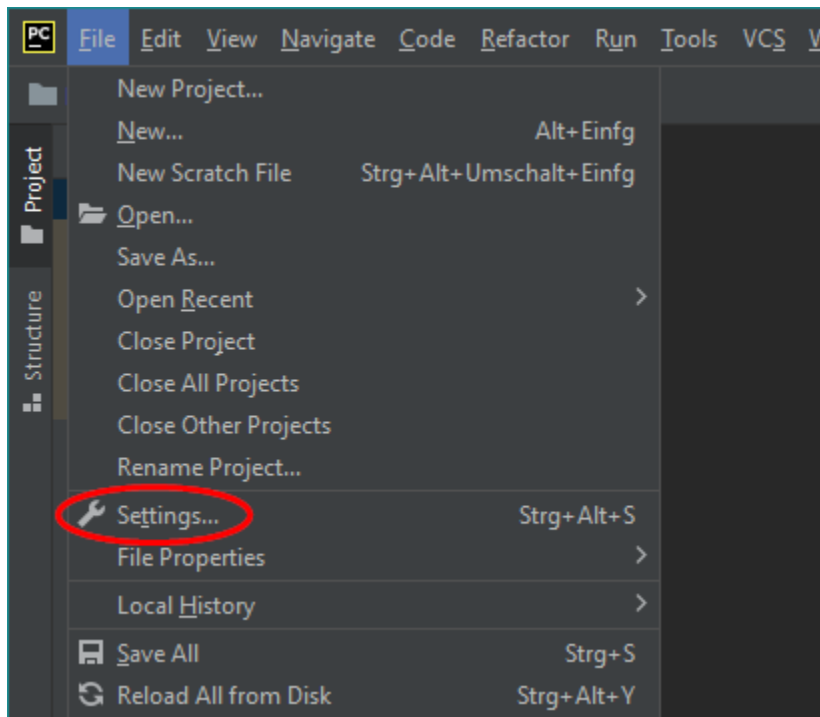
## 1.5 Usage with PyCharm

It's recommended to use PyCharm as an IDE for writing rules. The IDE can provide auto complete and static checks which will help write error free rules and vastly speed up development.

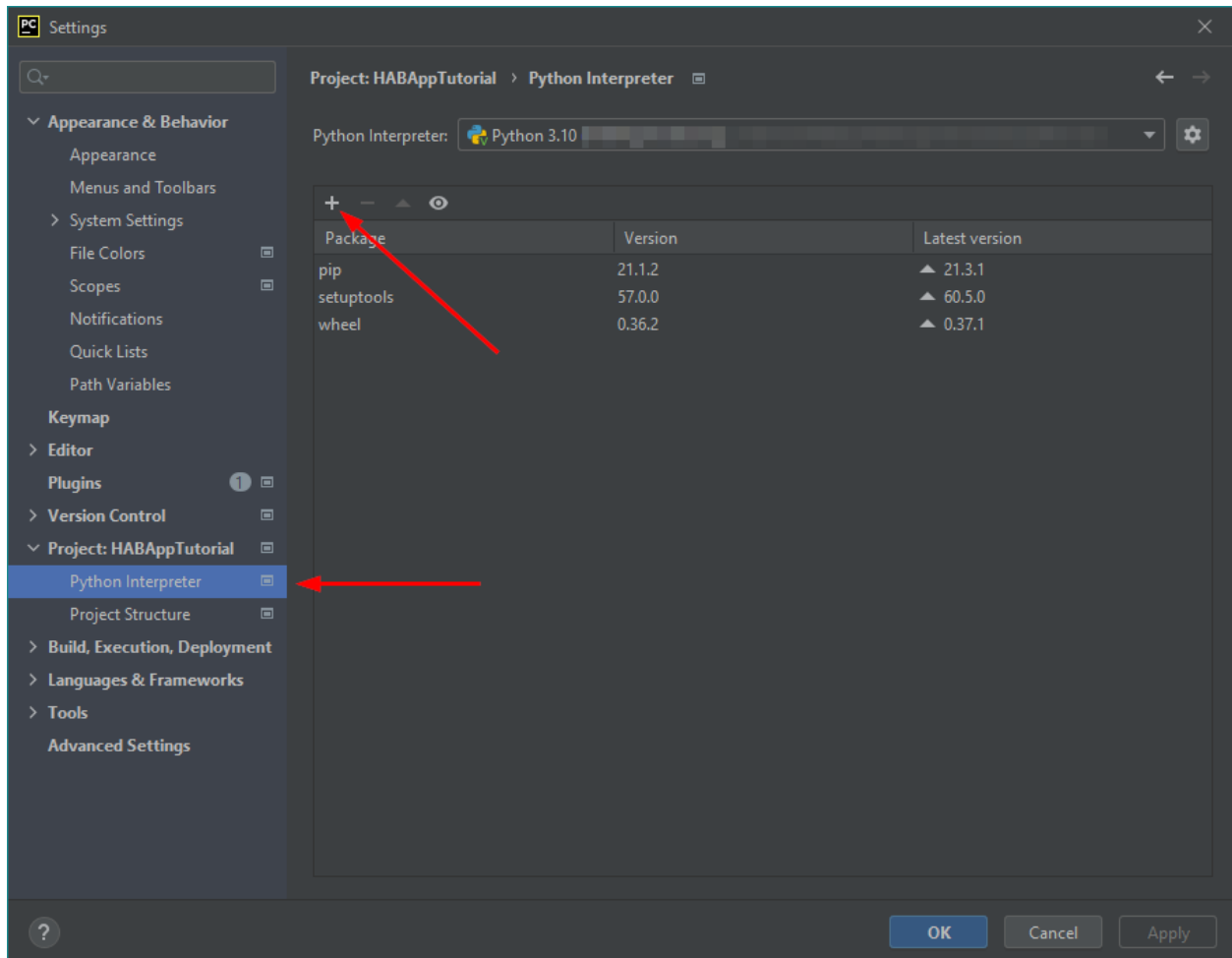
### 1.5.1 Type hints and checks

To enable type hints and checks HABApp needs to be installed in the python environment that is currently used by PyCharm. Ensure that the HABApp version for PyCharm matches the HABApp version that is currently deployed and running the rules. It is recommended to create a new virtual environment when creating a new project for HABApp.

Go to Settings and view the current python environment settings.

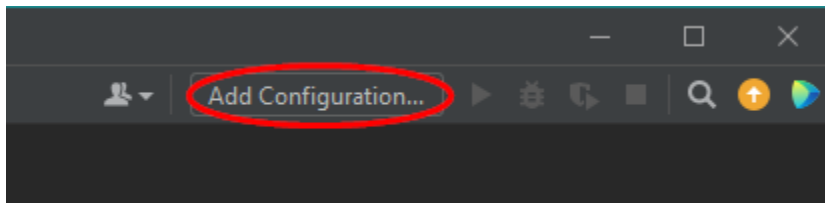


Install the HABApp package through the + symbol. Once the installation was successful PyCharm will provide checks and hints.

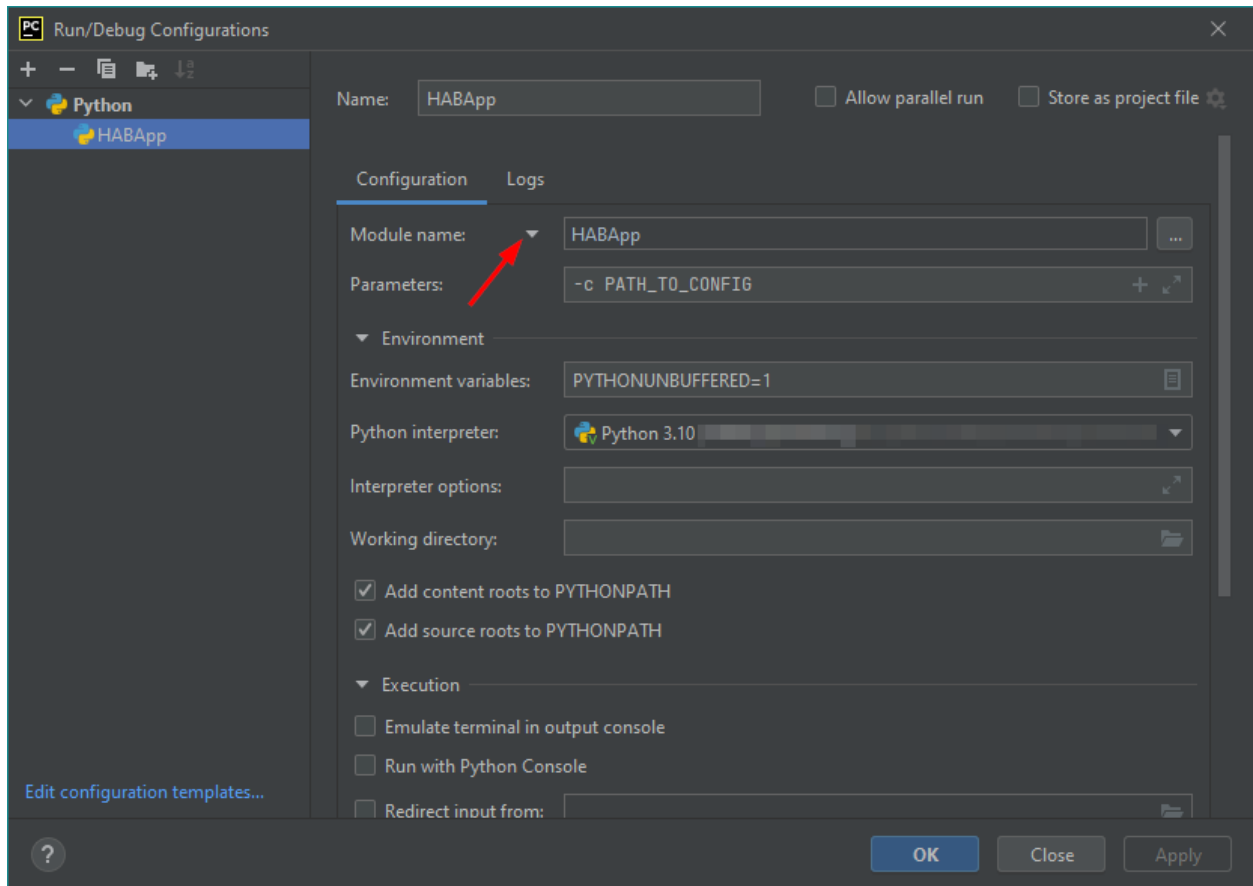


## 1.5.2 Start HABApp from PyCharm

It is possible to start HABApp directly from pycharm e.g. to debug things. Open the run configurations.



Switch to **Module** name execution with the small dropdown arrow. It's still necessary to supply a configuration file which can be done in the **Parameters** line.



After a click on “OK” HABApp can be run/debugged directly from pycharm.  
It’s even possible to create breakpoints in rules and inspect all objects.

## 1.6 Install a development version of HABApp

To try out new features or test some functionality it’s possible to install a branch directly from github. Installation works only in a virtual environment.

New features are typically first available in the `DeveloP` branch.

1. Navigate to the folder where the virtual environment was created:

```
cd /opt/habapp
```

2. Activate the virtual environment

Linux:

```
source bin/activate
```

Windows:

```
Scripts\activate
```

3. Remove existing HABApp installation:

```
python3 -m pip uninstall habapp
```

4. Install HABApp from the github branch (here Develop):

```
python3 -m pip install git+https://github.com/spacemanspiff2007/HABApp.git@Develop
```

5. Run HABApp as usual (e.g. through systemctl) or manually with:

```
habapp --config PATH_TO_CONFIGURATION_FOLDER
```

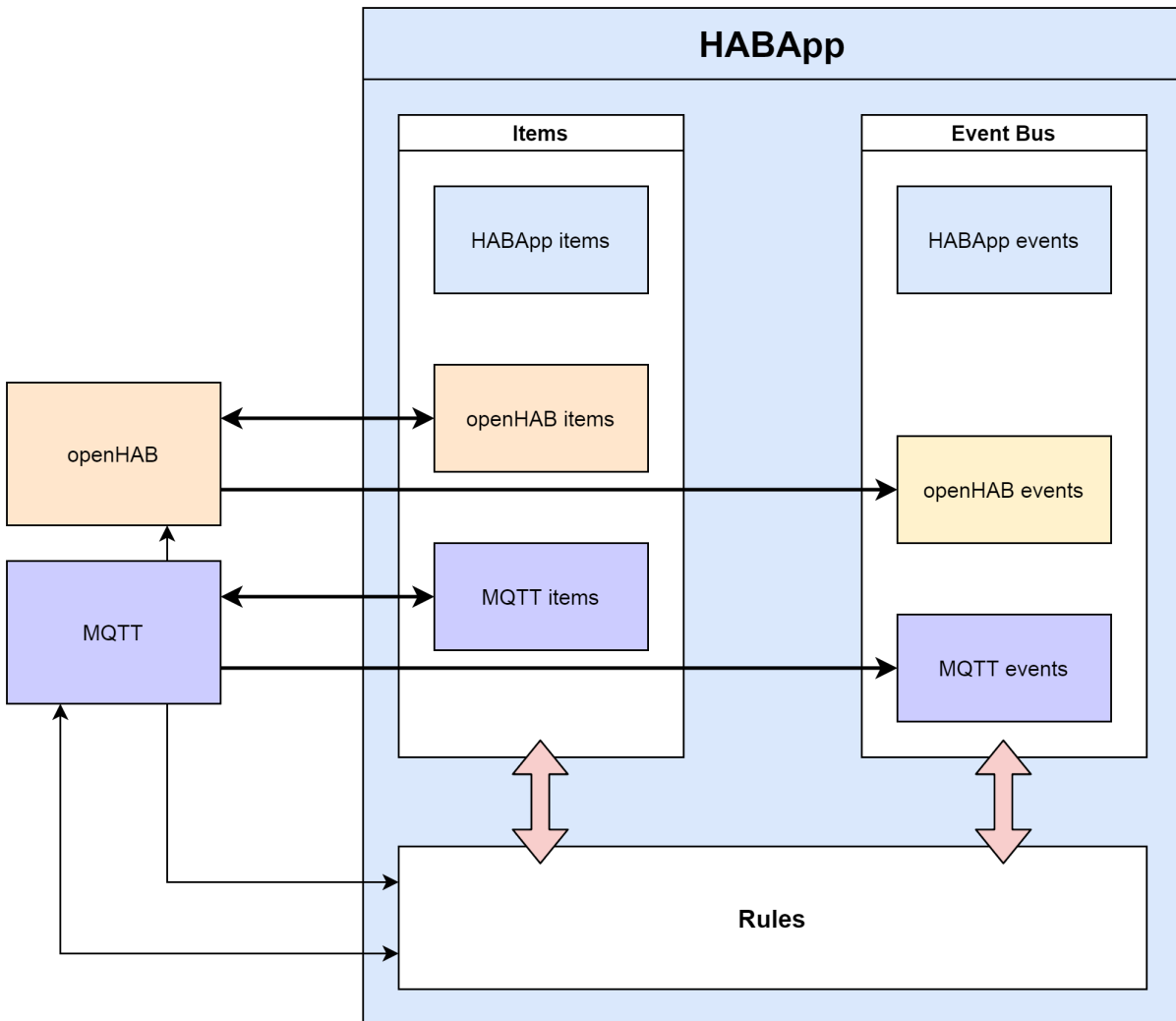


## ABOUT HABAPP

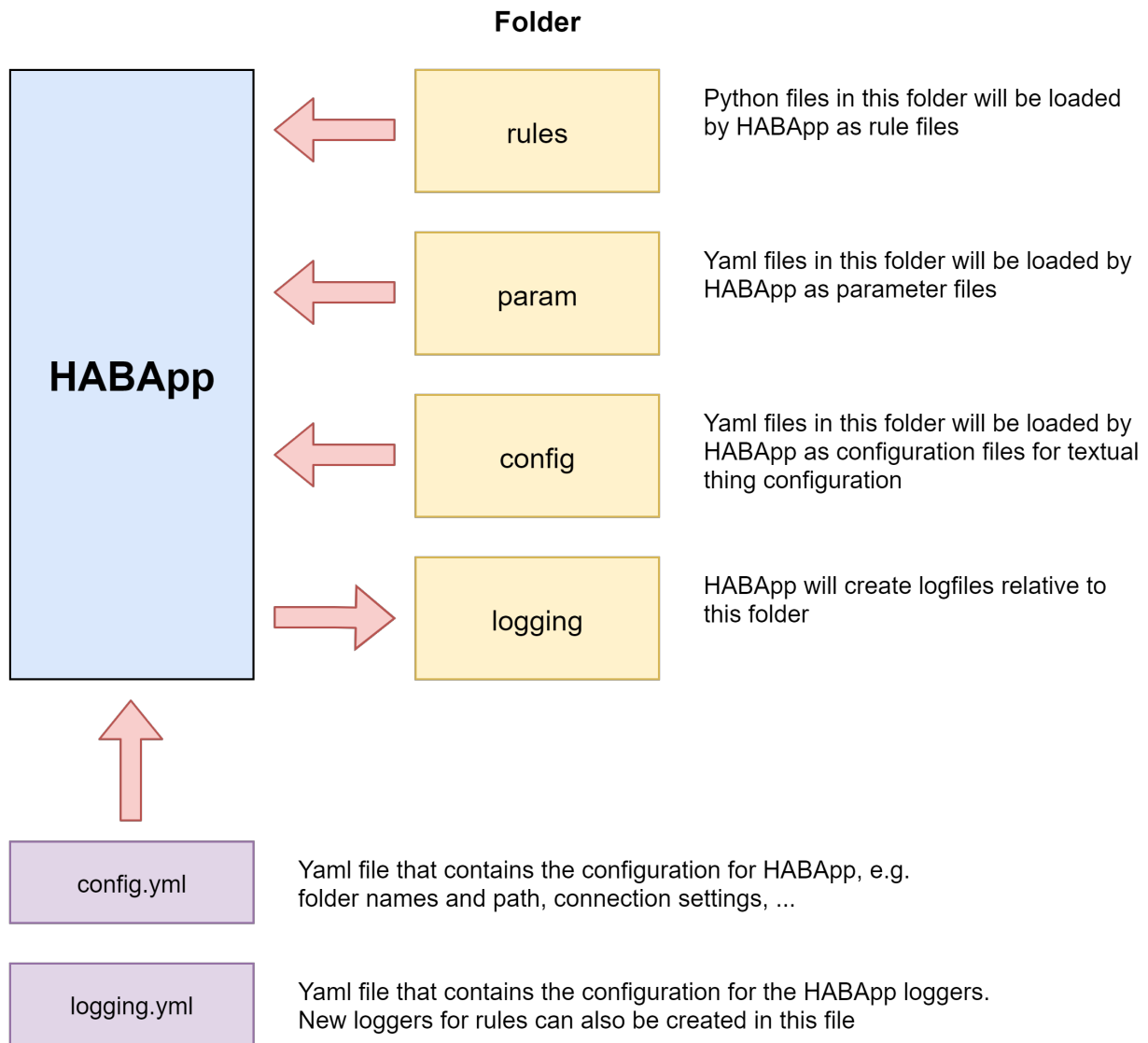
### 2.1 About

HABApp is a Python rule engine for home automation. It has local items, an event bus and can integrate external systems, e.g. openHAB and MQTT. Rules can listen to events from the event bus. These events are generated by HABApp or by the external systems. Additionally there is a scheduler available that makes time based triggering very easy.

## 2.2 HABApp architecture



## 2.3 HABApp folder structure



## 2.4 Integration with openHAB

HABApp connects to the openHAB event stream and automatically updates the local openHAB items when an item in openHAB changes. These item values are cached, so accessing and working with items in rules is very fast. The events from openHAB are also mirrored to the internal event bus which means that triggering on these events is also possible.

When HABApp connects to openHAB for the first time it will load all items/things from the openHAB instance and create local items. The name of the local openHAB items is equal to the name in openHAB.

Posting updates, sending commands or any other openHAB interface call will issue a corresponding REST-API call to change openHAB.

## 2.5 Integration with MQTT

HABApp subscribes to the defined mqtt topics. For every MQTT message with the `retain` flag HABApp will automatically create an *MqttItem* so these values can be accessed later. The name of the created item is the the mqtt topic. All other messages will **not** automatically create an item but still create an event on the event bus.

MqttItems created by rules will automatically be updated with the latest value once a message is received. These item values are cached, so accessing and working with items in rules is very fast.

## CONFIGURATION

### 3.1 Description

Configuration is done through `config.yml`. The parent folder of the file can be specified with `-c PATH` or `--config PATH`. If nothing is specified the file `config.yml` is searched in the subdirectory `HABApp` in

- the current working directory
- the `venv` directory
- the user home

If the config does not yet exist in the folder a blank configuration will be created

### 3.2 Example

```
directories:
  logging: log      # If the filename for the logfile in logging.yml is not absolute it
↳ will be placed in this directory
  rules: rules      # All *.py files in this folder (and subfolders) will be loaded.
↳ Load order will be alphabetical by path.
  param: param      # Optional, this is the folder where the parameter files will be
↳ created and loaded from
  config: config    # Folder from which configuration files for openHAB will be loaded
  lib: lib          # Custom modules, libraries and files can be placed there.
                    # (!) Attention (!):
                    # Don't create rule instances in files inside the lib folder! It will
↳ lead to strange behaviour.

location:           # Specify the location where your HABApp instance is running
  latitude: 0.0      # The value is used to calculate the Sunrise/Sunset etc accordingly
  longitude: 0.0
  elevation: 0.0

openhab:
  ping:
    enabled: true    # If enabled the configured item will show how long it
↳ takes to send an update from HABApp
                    # and get the updated value back in milliseconds
    item: 'HABApp_Ping' # Name of the NumberItem that will show the ping
```

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```

    interval: 10          # Seconds between two pings

    connection:
        url: http://localhost:8080
        user: ''
        password: ''

    general:
        listen_only: False # If True HABApp will not change any value on the openHAB_
↪instance.
                           # Useful for testing rules from another machine.
        wait_for_openhab: True # If True HABApp will wait for items from the openHAB_
↪instance
                           # before loading any rules on startup

mqtt:
    connection:
        identifier: HABApp
        host: ''
        port: 8883
        user: ''
        password: ''
        tls:
            enabled: false # Enable TLS for the connection
            insecure: false # Validate server hostname in server certificate
            ca cert: '' # Path to a CA certificate that will be treated as trusted
                        # (e.g. when using a self signed certificate)

    subscribe:          # Changes to Subscribe get picked up without restarting HABApp
        qos: 0          # Default QoS for subscribing
        topics:
            - '#'        # Subscribe to this topic, qos is default QoS
            - ['my/topic', 1] # Subscribe to this topic with explicit QoS

    publish:
        qos: 0          # Default QoS when publishing values
        retain: false   # Default retain flag when publishing values

    general:
        listen_only: False # If True HABApp will not publish any value to the broker.
                           # Useful for testing rules from another machine.

```

It's possible to use environment variables and files (e.g. docker secrets) in the configuration. See [the easyconfig documentation](#) for the exact syntax and examples.

## 3.3 Configuration Reference

All possible configuration options are described here. Not all entries are created by default in the config file and one should take extra care when changing those entries.

### settings ApplicationConfig

Structure that contains the complete configuration

**field directories:** *DirectoriesConfig* [Optional]

**field habapp:** *HABAppConfig* [Optional]

**field location:** *LocationConfig* [Optional]

**field mqtt:** *MqttConfig* [Optional]

**field openhab:** *OpenhabConfig* [Optional]

**model\_computed\_fields:** ClassVar[dict[str, ComputedFieldInfo]] = {}

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

### 3.3.1 Directories

#### settings DirectoriesConfig

Configuration of directories that are used

**field config:** Optional[Path] = 'config'

Folder from which configuration files (e.g. for textual thing configuration) will be loaded

**field lib:** Optional[Path] = 'lib'

Folder where additional libraries can be placed

**field logging:** Path = 'log'

Folder where the logs will be written to

**field param:** Optional[Path] = 'params'

Folder from which the parameter files will be loaded

**field rules:** Path = 'rules'

Folder from which the rule files will be loaded

**classmethod ensure\_folder**(value)

**model\_computed\_fields:** ClassVar[dict[str, ComputedFieldInfo]] = {}

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

### 3.3.2 Location

#### settings LocationConfig

location where the instance is running. Is used to calculate Sunrise/Sunset.

**field elevation:** float = 0.0

**field latitude:** float = 0.0

```
field longitude: float = 0.0
```

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

### 3.3.3 MQTT

#### settings MqttConfig

MQTT configuration

```
field connection: Connection [Optional]
```

```
field general: General [Optional]
```

```
field publish: Publish [Optional]
```

```
field subscribe: Subscribe [Optional]
```

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

#### Connection

##### settings Connection

```
field host: str = ''
```

Connect to this host. Empty string ("") disables the connection.

```
field identifier: str = 'HABApp-MqGBWvvrCyclq'
```

Identifier that is used to uniquely identify this client on the mqtt broker.

```
field password: str = ''
```

```
field port: int = 1883
```

```
field tls: TLSSettings [Optional]
```

```
field user: str = ''
```

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

#### TLS

##### settings TLSSettings

```
field ca_cert: Path = ''
```

Path to a CA certificate that will be treated as trusted

```
field enabled: bool = True
```

Enable TLS for the connection

```
field insecure: bool = False
```

Validate server hostname in server certificate



```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## Subscribe

### settings Subscribe

```
field qos: Literal[0, 1, 2] = 0
```

Default QoS for subscribing

```
field topics: Tuple[Tuple[str, Optional[Literal[0, 1, 2]]], ...] = ('#',)
```

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## Publish

### settings Publish

```
field qos: Literal[0, 1, 2] = 0
```

Default QoS when publishing values

```
field retain: bool = False
```

Default retain flag when publishing values

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## General

### settings General

```
field listen_only: bool = False
```

If True HABApp does not publish any value to the broker

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## 3.3.4 Openhab

### settings OpenhabConfig

```
field connection: Connection [Optional]
```

```
field general: General [Optional]
```

```
field ping: Ping [Optional]
```

```
model_computed_fields: ClassVar[dict[str, ComputedFieldInfo]] = {}
```

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## Connection

### settings Connection

**field buffer:** `ByteSize = '128kib'`

Buffer for reading lines in the SSE event handler. This is the buffer that gets allocated for every(!) request and SSE message that the client processes. Increase only if you get error messages or disconnects e.g. if you use large images.

**field password:** `str = ''`

**field topic filter:** `str = 'openhab/items/*,openhab/channels/*,openhab/things/*'`

Topic filter for subscribing to openHAB. This filter is processed by openHAB and only events matching this filter will be sent to HABApp.

**field url:** `str = 'http://localhost:8080'`

Connect to this url. Empty string (``) disables the connection.

**field user:** `str = ''`

**field verify\_ssl:** `bool = True`

Check certificates when using https

**model\_computed\_fields:** `ClassVar[dict[str, ComputedFieldInfo]] = {}`

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## Ping

### settings Ping

**field enabled:** `bool = True`

If enabled the configured item will show how long it takes to send an update from HABApp and get the updated value back from openHAB in milliseconds

**field interval:** `Union[int, float] = 10`

Seconds between two pings

#### Constraints

- `ge = 0.1`

**field item:** `str = 'HABApp_Ping'`

Name of the Numberitem

**model\_computed\_fields:** `ClassVar[dict[str, ComputedFieldInfo]] = {}`

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## General

### settings General

**field listen\_only:** `bool = False`

If True HABApp does not change anything on the openHAB instance.

**field min\_start\_level:** `int = 70`

Minimum openHAB start level to load items and listen to events

#### Constraints

- `ge = 0`
- `le = 100`

**field min\_uptime:** `int = 60`

Minimum openHAB uptime in seconds to load items and listen to events

#### Constraints

- `ge = 0`
- `le = 3600`

**field wait\_for\_openhab:** `bool = True`

If True HABApp will wait for a successful openHAB connection before loading any rules on startup

**model\_computed\_fields:** `ClassVar[dict[str, ComputedFieldInfo]] = {}`

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## 3.3.5 HABApp

### settings HABAppConfig

HABApp internal configuration. Only change values if you know what you are doing!

**field logging:** `LoggingConfig [Optional]`

**field thread pool:** `ThreadPoolConfig [Optional]`

**model\_computed\_fields:** `ClassVar[dict[str, ComputedFieldInfo]] = {}`

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## ThreadPool

### settings ThreadPoolConfig

**field enabled:** `bool = True`

When the thread pool is disabled HABApp will become an asyncio application. Use only if you have experience developing asyncio applications! If the thread pool is disabled using blocking calls in functions can and will break HABApp

**field threads:** `Annotated[int] = 10`

Amount of threads to use for the executor

#### Constraints

- `ge = 1`

- `le = 16`

**model\_computed\_fields:** `ClassVar[dict[str, ComputedFieldInfo]] = {}`

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## Logging

**settings LoggingConfig**

**field flush every:** `float = 0.5`

Wait time in seconds before the buffer gets flushed again when it was empty

### Constraints

- `ge = 0.1`

**field use buffer:** `bool = True`

Automatically inject a buffer for the event log

**model\_computed\_fields:** `ClassVar[dict[str, ComputedFieldInfo]] = {}`

A dictionary of computed field names and their corresponding *ComputedFieldInfo* objects.

## GETTING STARTED

It is really recommended to use a python IDE, for example PyCharm. The IDE can provide auto complete and static checks which will help you write error free rules and vastly speed up your development.

First start HABApp and keep it running. It will automatically load and update all rules which are created or changed in the configured rules directory. Loading and unloading of rules can be observed in the HABApp logfile.

It is recommended to use HABApp from the console for these examples so the print output can be observed.

### 4.1 First rule

Rules are written as classes that inherit from `HABApp.Rule`. Once the class gets instantiated the will run as rules in the HABApp rule engine. So lets write a small rule which prints something.

```
import HABApp

# Rules are classes that inherit from HABApp.Rule
class MyFirstRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

        # Use run.at to schedule things directly after instantiation,
        # don't do blocking things in __init__
        self.run.soon(self.say_something)

    def say_something(self):
        print('That was easy!')

# Rules
MyFirstRule()
```

That was easy!

## 4.2 A more generic rule

It is also possible to instantiate the rules with parameters. This often comes in handy if there is some logic that shall be applied to different items.

```
import HABApp

class MyFirstRule(HABApp.Rule):
    def __init__(self, my_parameter):
        super().__init__()
        self.param = my_parameter

        self.run.soon(self.say_something)

    def say_something(self):
        print(f'Param {self.param}')

# This is normal python code, so you can create Rule instances as you like
for i in range(2):
    MyFirstRule(i)
for t in ['Text 1', 'Text 2']:
    MyFirstRule(t)
```

```
Param 0
Param 1
Param Text 1
Param Text 2
```

## 4.3 Interacting with items

HABApp uses an internal item registry to store both openHAB items and locally created items (only visible within HABApp). Upon start-up HABApp retrieves a list of openHAB items and adds them to the internal registry. Rules and HABApp derived libraries may add additional local items which can be used to share states across rules and/or files.

### 4.3.1 Access

An item is created and added to the item registry through the corresponding class factory method

```
from HABApp.core.items import Item

# This will create an item in the local (HABApp) item registry
item = Item.get_create_item("an-item-name", "a value")
```

### 4.3.2 Values

Posting values from the item will automatically create the events on the event bus. This example will create an item in HABApp (locally) and post some updates to it. To access items from openHAB use the correct openHAB item type (see *the openHAB item description*).

```
import HABApp
from HABApp.core.items import Item

class MyFirstRule(HABApp.Rule):
    def __init__(self):
        super().__init__()
        # Get the item or create it if it does not exist
        self.my_item = Item.get_create_item('Item_Name')

        self.run.soon(self.say_something)

    def say_something(self):
        # Post updates to the item through the internal event bus
        self.my_item.post_value('Test')
        self.my_item.post_value('Change')

        # The item value can be used in comparisons through this shortcut ...
        if self.my_item == 'Change':
            print('Item value is "Change"')
        # ... which is the same as this:
        if self.my_item.value == 'Change':
            print('Item.value is "Change"')

MyFirstRule()
```

```
[ HABApp.Items]    DEBUG | Added Item_Name (Item)
[HABApp.EventBus]  INFO | Item_Name: <ValueUpdateEvent name: Item_Name,
↪value: Test>
[HABApp.EventBus]  INFO | Item_Name: <ValueChangeEvent name: Item_Name,
↪value: Test, old_value: None>
[HABApp.EventBus]  INFO | Item_Name: <ValueUpdateEvent name: Item_Name,
↪value: Change>
[HABApp.EventBus]  INFO | Item_Name: <ValueChangeEvent name: Item_Name,
↪value: Change, old_value: Test>
Item value is "Change"
Item.value is "Change"
```

### 4.3.3 Timestamps

All items have two additional timestamps set which can be used to simplify rule logic.

- The time when the item was last updated
- The time when the item was last changed.

```
import HABApp
from HABApp.core.items import Item

class TimestampRule(HABApp.Rule):
    def __init__(self):
        super().__init__()
        # This item was created by another rule, that's why "get_item" is used
        self.my_item = Item.get_item('Item_Name')

        # Access of timestamps
        print(f'Last update: {self.my_item.last_update}')
        print(f'Last change: {self.my_item.last_change}')

TimestampRule()
```

```
Last update: 2022-08-20T12:16:00
Last change: 2022-08-20T10:30:00
```

## 4.4 Watch items for events

It is possible to watch items for changes or updates. The `listen_event` function takes an instance of `EventFilter` which describes the kind of event that will be passed to the callback.

```
import HABApp
from HABApp.core.items import Item
from HABApp.core.events import ValueUpdateEventFilter, ValueChangeEventFilter, \
    ValueChangeEvent, ValueUpdateEvent

class MyFirstRule(HABApp.Rule):
    def __init__(self):
        super().__init__()
        # Get the item or create it if it does not exist
        self.my_item = Item.get_create_item('Item_Name')

        # Run this function whenever the item receives an ValueUpdateEvent
        self.listen_event(self.my_item, self.item_updated, ValueUpdateEventFilter())

        # If you already have an item you can use the more convenient method of the item
        # This is the recommended way to use the event listener
        self.my_item.listen_event(self.item_updated, ValueUpdateEventFilter())

        # Run this function whenever the item receives an ValueChangeEvent
        self.my_item.listen_event(self.item_changed, ValueChangeEventFilter())
```

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```
# the function has 1 argument which is the event
def item_updated(self, event: ValueUpdateEvent):
    print(f'{event.name} updated value: "{event.value}"')
    print(f'Last update of {self.my_item.name}: {self.my_item.last_update}')

def item_changed(self, event: ValueChangeEvent):
    print(f'{event.name} changed from "{event.old_value}" to "{event.value}"')
    print(f'Last change of {self.my_item.name}: {self.my_item.last_change}')
```

```
MyFirstRule()
```

```
Item_Name updated value: "Changed value"
Last update of Item_Name: 2024-02-14T05:56:15.027549
Item_Name updated value: "Changed value"
Last update of Item_Name: 2024-02-14T05:56:15.027549
Item_Name changed from "Some value" to "Changed value"
Last change of Item_Name: 2024-02-14T05:56:15.027549
```

## 4.5 Trigger an event when an item is constant

```
import HABApp
from HABApp.core.items import Item
from HABApp.core.events import ItemNoChangeEvent

class MyFirstRule(HABApp.Rule):
    def __init__(self):
        super().__init__()
        # Get the item or create it if it does not exist
        self.my_item = Item.get_create_item('Item_Name')

        # This will create an event if the item is 10 secs constant
        watcher = self.my_item.watch_change(10)

        # this will automatically listen to the correct event
        watcher.listen_event(self.item_constant)

        # To listen to all ItemNoChangeEvent/ItemNoUpdateEvent independent of the
        ↪ timeout time use
        # self.listen_event(self.my_item, self.item_constant, watcher.EVENT)

    def item_constant(self, event: ItemNoChangeEvent):
        print(f'{event}')
```

```
MyFirstRule()
```

```
<ItemNoChangeEvent name: Item_Name, seconds: 10>
```

## 4.6 Convenience functions

HABApp provides some convenience functions which make the rule creation easier and reduce boiler plate code.

### 4.6.1 post\_value\_if

`post_value_if` will post a value to the item depending on its current state. There are various comparisons available (see [documentation](#)) Something similar is available for openHAB items (`oh_post_update_if`)

```
import HABApp
from HABApp.core.items import Item

class MyFirstRule(HABApp.Rule):
    def __init__(self):
        super().__init__()
        # Get the item or create it if it does not exist
        self.my_item = Item.get_create_item('Item_Name')

        self.run.soon(self.say_something)

    def say_something(self):

        # This construct
        if self.my_item != 'overwrite value':
            self.my_item.post_value('Test')

        # ... is equivalent to
        self.my_item.post_value_if('Test', not_equal='overwrite value')

        # This construct
        if self.my_item == 'overwrite value':
            self.my_item.post_value('Test')

        # ... is equivalent to
        self.my_item.post_value_if('Test', equal='overwrite value')

MyFirstRule()
```

## LOGGING

## 5.1 Configuration

Configuration of logging is done through the `logging.yml`. During the first start a default configuration will be created. It is recommended to extend the default configuration.

The complete description of the file format can be found [here](#), but the format should be pretty straight forward.

**Hint:**

It is highly recommended to use an absolute path as a file name, at least for the `HABApp.log`. That way even if the HABApp configuration is invalid HABApp can still log the errors that have occurred.  
e.g.: `/HABApp/logs/habapp.log` or `c:\HABApp\logs\habapp.log`

## 5.2 Provided loggers

The `HABApp.config.logging` module provides additional loggers which can be used

**class `MidnightRotatingFileHandler(*args, **kwargs)`**

A rotating file handler that checks once after midnight if the configured size has been exceeded and then rotates the file

**class `CompressedMidnightRotatingFileHandler(*args, **kwargs)`**

Same as `MidnightRotatingFileHandler` but rotates the file to a gzipped archive (`.gz`)

## 5.3 Example

### 5.3.1 Usage

The logging library is the standard python library and an extensive description can be found [in the official documentation](#).

```
import logging
import HABApp
```

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```
log = logging.getLogger('MyRule')

class MyLoggingRule(HABApp.Rule):

    def __init__(self):
        super().__init__()

        # different levels are available
        log.debug('Debug Message')
        log.info('Info Message')
        log.warning('Warning Message')
        log.error('Error Message')

MyLoggingRule()
```

To make the logging output work properly an output file and an output format has to be configured for the logger. The logging library supports a logging hierarchy so the configuration for the logger `MyRule` will also work logger `MyRule.SubLogger` and `MyRule.SubLogger.SubSubLogger`.

The output of our logger from the example shall be in a separate file so we add a new output file to the file configuration under handlers in the `logging.yml`.

```
handlers:
    ...

    MyRuleHandler: # <-- This is the name of the handler
        class: HABApp.config.logging.MidnightRotatingFileHandler
        filename: 'c:\HABApp\Logs\MyRule.log'
        maxBytes: 10_000_000
        backupCount: 3

        formatter: HABApp_format # use this format
        level: DEBUG
```

The output file is now available for logging but the configuration for the logger is still missing. It has to be added under loggers and reference the handler we created

```
loggers:
    ...

    MyRule: # <-- Name of the logger
        level: DEBUG # <-- minimum Logging level, e.g. use INFO if you don't want the
        ↪ output of log.debug()
        handlers:
            - MyRuleHandler # This logger uses the MyRuleHandler
        propagate: False
```

Now the logger works as expected and writes all output to the new file.

### 5.3.2 Full Example configuration

```
# -----
# Configuration of the available output formats
# -----
formatters:
  HABApp_format:
    format: '%(asctime)s] [%(name)25s] %(levelname)8s | %(message)s'

# -----
# Configuration of the available file handlers (output files)
# -----
handlers:
  HABApp_default:
    class: HABApp.config.logging.MidnightRotatingFileHandler
    filename: 'HABApp.log'
    maxBytes: 10_000_000
    backupCount: 3

    formatter: HABApp_format # use the specified formatter (see above)
    level: DEBUG

  MyRuleHandler:
    class: HABApp.config.logging.MidnightRotatingFileHandler
    filename: 'c:\HABApp\Logs\MyRule.log' # absolute filename is recommended
    maxBytes: 10_000_000
    backupCount: 3

    formatter: HABApp_format # use the specified formatter (see above)
    level: DEBUG

# -----
# Configuration of all available loggers and their configuration
# -----
loggers:
  HABApp:
    level: DEBUG
    handlers:
      - HABApp_default # This logger does log with the default handler
    propagate: False

  MyRule: # <-- Name of the logger
    level: DEBUG
    handlers:
      - MyRuleHandler # This logger uses the MyRuleHandler
    propagate: False
```

## 5.4 Custom log levels

It is possible to add custom log levels or rename existing levels. This is possible via the optional `levels` entry in the logging configuration file.

```
levels:
  WARNING: WARN    # Changes WARNING to WARN
  5: TRACE         # Adds a new loglevel "TRACE" with value 5

formatters:
  HABApp_format:
  ...
```

## 5.5 Logging to stdout

The following handler writes to stdout

```
handlers:
  StdOutHandler:
    class: logging.StreamHandler
    stream: ext://sys.stdout

    formatter: HABApp_format
    level: DEBUG
```

## 5.6 Add custom filters to loggers

It's possible to filter out certain parts of log files with a `filter`. The recommendation is to create the filter *during startup*.

This example ignores all messages for the `HABApp.EventBus` logger that contain `MyIgnoredString`.

```
import logging

# False to skip, True to log record
def filter(record: logging.LogRecord) -> bool:
    return 'MyIgnoredString' not in record.msg

logging.getLogger('HABApp.EventBus').addFilter(filter)
```

---

### Note:

Regular expressions for a filter should be compiled outside of the filter function with `re.compile` for performance reasons.

A simple subtext search however will always have way better performance.

---

## 6.1 Interacting with items

Items are like variables. They have a name and a value (which can be anything). Items from openHAB use the item name from openHAB and get created when HABApp successfully connects to openHAB or when the openHAB configuration changes. Items from MQTT use the topic as item name and get created as soon as a message gets processed.

Some item types provide convenience functions, so it is advised to always set the correct item type.

The preferred way to get and create items is through the class factories `get_item` and `get_create_item` since this ensures the proper item class and provides type hints when using an IDE! Example:

```
from HABApp.core.items import Item
my_item = Item.get_create_item('MyItem', initial_value=5)    # This will create the item,
↳ if it does not exist
my_item = Item.get_item('MyItem')                            # This will raise an
↳ exception if the item is not found
print(my_item)
```

If an item value gets set there will be a `ValueUpdateEvent` on the event bus. If it changes there will be additionally a `ValueChangeEvent`, too.

It is possible to check the item value by comparing it

```
from HABApp.core.items import Item
my_item = Item.get_item('MyItem')

# this works
if my_item == 5:
    pass    # do something

# and is the same as this
if my_item.value == 5:
    pass    # do something
```

An overview over the item types can be found on [the HABApp item section](#), [the openHAB item section](#) and the [the mqtt item section](#)

## 6.2 Interacting with events

It is possible to listen to events through the `listen_event()` function. The passed function will be called as soon as an event occurs and the event will be passed as an argument into the function.

There is the possibility to reduce the function calls to a certain event type with an additional event filter (typically `ValueUpdateEventFilter` or `ValueChangeEventFilter`).

An overview over the events can be found on *the HABApp event section*, *the openHAB event section* and the *the MQTT event section* Example

```
from HABApp import Rule
from HABApp.core.events import ValueChangeEvent, ValueUpdateEvent,
↳ValueChangeEventFilter, ValueUpdateEventFilter
from HABApp.core.items import Item

class MyRule(Rule):
    def __init__(self):
        super().__init__()
        self.listen_event('MyOpenhabItem', self.on_change, ValueChangeEventFilter()) #↳
↳trigger only on ValueChangeEvent
        self.listen_event('My/MQTT/Topic', self.on_update, ValueUpdateEventFilter()) #↳
↳trigger only on ValueUpdateEvent

        # If you already have an item you can and should use the more convenient method
↳of the item
        # to listen to the item events
        my_item = Item.get_item('MyItem')
        my_item.listen_event(self.on_change, ValueUpdateEventFilter())

    def on_change(self, event: ValueChangeEvent):
        assert isinstance(event, ValueChangeEvent), type(event)

    def on_update(self, event: ValueUpdateEvent):
        assert isinstance(event, ValueUpdateEvent), type(event)

MyRule()
```

Additionally there is the possibility to filter not only on the event type but on the event values, too. This can be achieved by passing the value to the event filter. There are convenience Filters (e.g. `ValueUpdateEventFilter` and `ValueChangeEventFilter`) for the most used event types that provide type hints.



### 6.2.1 NoEventFilter

**class NoEventFilter**  
Triggers on all events

### 6.2.2 EventFilter

**class EventFilter**(*event\_class*, *\*\*kwargs*)  
Triggers on event types and optionally on their values, too

### 6.2.3 ValueUpdateEventFilter

**class ValueUpdateEventFilter**(*value=<MISSING>*)

### 6.2.4 ValueChangeEventFilter

**class ValueChangeEventFilter**(*value=<MISSING>*, *old\_value=<MISSING>*)

### 6.2.5 AndFilterGroup

**class AndFilterGroup**(*\*args*)  
All child filters have to match

### 6.2.6 OrFilterGroup

**class OrFilterGroup**(*\*args*)  
Only one child filter has to match

### 6.2.7 Example

Example

```
from HABApp import Rule
from HABApp.core.events import EventFilter, ValueUpdateEventFilter, ValueUpdateEvent, OrFilterGroup
from HABApp.core.items import Item

class MyRule(Rule):
    def __init__(self):
        super().__init__()
        my_item = Item.get_item('MyItem')

        # This will only call the callback for ValueUpdateEvents
        my_item.listen_event(self.on_val_my_value, ValueUpdateEventFilter())

        # This will only call the callback for ValueUpdateEvents where the value==my_
```

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```

↪value
    my_item.listen_event(self.on_val_my_value, ValueUpdateEventFilter(value='my_value'
↪'))

    # This is the same as above but with the generic filter
    my_item.listen_event(self.on_val_my_value, EventFilter(ValueUpdateEvent, value=
↪'my_value'))

    # trigger if the value is 1 or 2 by using both filters with or
    my_item.listen_event(
        self.value_1_or_2,
        OrFilterGroup(
            ValueUpdateEventFilter(value=1), ValueUpdateEventFilter(value=2)
        )
    )

    def on_val_my_value(self, event: ValueUpdateEvent):
        assert isinstance(event, ValueUpdateEvent), type(event)

    def value_1_or_2(self, event: ValueUpdateEvent):
        assert isinstance(event, ValueUpdateEvent), type(event)

MyRule()

```

## 6.3 Scheduler

With the scheduler it is easy to call functions in the future or periodically. Do not use `time.sleep` but rather `self.run.at`. Another very useful function is `self.run.countdown` as it can simplify many rules!

Function	Description
<code>soon()</code>	Run the callback as soon as possible (typically in the next second).
<code>at()</code>	Run the callback in x seconds or at a specified time.
<code>countdown()</code>	Run a function after a time has run down
<code>every()</code>	Run a function periodically
<code>every_minute()</code>	Run a function every minute
<code>every_hour()</code>	Run a function every hour
<code>on_every_day()</code>	Run a function at a specific time every day
<code>on_workdays()</code>	Run a function at a specific time on workdays
<code>on_weekends()</code>	Run a function at a specific time on weekends
<code>on_day_of_week()</code>	Run a function at a specific time on specific days of the week
<code>on_sun_dawn()</code>	Run a function on dawn
<code>on_sunrise()</code>	Run a function on sunrise
<code>on_sunset()</code>	Run a function on sunset
<code>on_sun_dusk()</code>	Run a function on dusk

All functions return an instance of `ScheduledCallbackBase`

```
class HABAppSchedulerView(context)
```

**at**(*time*, *callback*, \**args*, \*\**kwargs*)

Create a a job that will run at a specified time.

**Parameters**

- **time** (`Union[None, datetime, timedelta, time, int]`) –
- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type**

*OneTimeJob*

**Returns**

Created job

**countdown**(*expire\_time*, *callback*, \**args*, \*\**kwargs*)

Run a job a specific time after calling `reset()` of the job. Another subsequent call to `reset()` will start the countdown again.

**Parameters**

- **expire\_time** (`Union[timedelta, float, int]`) – countdown in seconds or a timedelta obj
- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type**

*CountdownJob*

**Returns**

Created job

**every**(*start\_time*, *interval*, *callback*, \**args*, \*\**kwargs*)

Create a job that will run at a specific interval.

**Parameters**

- **start\_time** (`Union[None, datetime, timedelta, time, int]`) – First execution time
- **interval** (`Union[int, float, timedelta]`) – Interval how the job is repeated
- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type**

*ReoccurringJob*

**Returns**

Created job

**on\_day\_of\_week**(*time*, *weekdays*, *callback*, \**args*, \*\**kwargs*)

Create a job that will run at a certain time on certain days during the week.

**Parameters**

- **time** (`Union[time, datetime]`) – Time when the job will run
- **weekdays** (`Union[str, Iterable[Union[str, int]]]`) – Day group names (e.g. 'all', 'weekend', 'workdays'), an iterable with day names (e.g. ['Mon', 'Fri']) or an iterable with the isoweekday values (e.g. [1, 5]).
- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type***DayOfWeekJob***Returns**

Created job

**on\_every\_day**(*time*, *callback*, \**args*, \*\**kwargs*)

Create a job that will run at a certain time of day

**Parameters**

- **time** (`Union[time, datetime]`) – Time when the job will run
- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type***DayOfWeekJob***on\_sunrise**(*callback*, \**args*, \*\**kwargs*)

Create a job that will run on sunrise, requires a location to be set

**Parameters**

- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type***SunriseJob***Returns**

Created job

**on\_sunset**(*callback*, \**args*, \*\**kwargs*)

Create a job that will run on sunset, requires a location to be set

**Parameters**

- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type***SunsetJob***Returns**

Created job

**on\_sun\_dawn**(*callback*, \*args, \*\*kwargs)

Create a job that will run on dawn, requires a location to be set

**Parameters**

- **callback** (Callable[[ParamSpec(HINT\_CB\_P)], Any]) – Function which will be called
- **args** (ParamSpecArgs) – Positional arguments that will be passed to the function
- **kwargs** (ParamSpecKwargs) – Keyword arguments that will be passed to the function

**Return type**

*DawnJob*

**Returns**

Created job

**on\_sun\_dusk**(*callback*, \*args, \*\*kwargs)

Create a job that will run on dusk, requires a location to be set

**Parameters**

- **callback** (Callable[[ParamSpec(HINT\_CB\_P)], Any]) – Function which will be called
- **args** (ParamSpecArgs) – Positional arguments that will be passed to the function
- **kwargs** (ParamSpecKwargs) – Keyword arguments that will be passed to the function

**Return type**

*DuskJob*

**Returns**

Created job

**soon**(*callback*, \*args, \*\*kwargs)

Run the callback as soon as possible.

**Parameters**

- **callback** (Callable[[ParamSpec(HINT\_CB\_P)], Any]) – Function which will be called
- **args** (ParamSpecArgs) – Positional arguments that will be passed to the function
- **kwargs** (ParamSpecKwargs) – Keyword arguments that will be passed to the function

**Return type**

*OneTimeJob*

**every\_minute**(*callback*, \*args, \*\*kwargs)

Picks a random second and runs the callback every minute

**Parameters**

- **callback** (Callable[[ParamSpec(HINT\_CB\_P)], Any]) – Function which will be called
- **args** (ParamSpecArgs) – Positional arguments that will be passed to the function
- **kwargs** (ParamSpecKwargs) – Keyword arguments that will be passed to the function

**Return type**

*ReoccurringJob*

**on\_weekends**(*time*, *callback*, \*args, \*\*kwargs)

Create a job that will run at a certain time on weekends.

**Parameters**

- **time** (`Union[time, datetime]`) – Time when the job will run
- **callback** – Function which will be called
- **args** – Positional arguments that will be passed to the function
- **kwargs** – Keyword arguments that will be passed to the function

**Return type**`DayOfWeekJob`**Returns**`Created job`**on\_workdays**(*time, callback, \*args, \*\*kwargs*)

Create a job that will run at a certain time on workdays.

**Parameters**

- **time** (`Union[time, datetime]`) – Time when the job will run
- **callback** – Function which will be called
- **args** – Positional arguments that will be passed to the function
- **kwargs** – Keyword arguments that will be passed to the function

**Return type**`DayOfWeekJob`**Returns**`Created job`**every\_hour**(*callback, \*args, \*\*kwargs*)

Picks a random minute and second and run the callback every hour

**Parameters**

- **callback** (`Callable[[ParamSpec(HINT_CB_P)], Any]`) – Function which will be called
- **args** (`ParamSpecArgs`) – Positional arguments that will be passed to the function
- **kwargs** (`ParamSpecKwargs`) – Keyword arguments that will be passed to the function

**Return type**`ReoccurringJob`

## 6.4 Other tools and scripts

HABApp provides convenience functions to run other tools and scripts. The working directory for the new process is by default the folder of the HABApp configuration file.

### 6.4.1 Running tools

External tools can be run with the `execute_subprocess()` function. Once the process has finished the callback will be called with the captured output of the process. Example:

```
import HABApp

class MyExecutionRule(HABApp.Rule):

    def __init__(self):
        super().__init__()

        self.execute_subprocess( self.func_when_finished, 'path_to_program', 'arg1_for_
↪program')

    def func_when_finished(self, process_output: str):
        print(process_output)

MyExecutionRule()
```

### 6.4.2 Running python scripts or modules

Python scripts can be run with the `execute_python()` function. The working directory for a script is by default the folder of the script. Once the script or module has finished the callback will be called with the captured output of the module/script. Example:

```
import HABApp

class MyExecutionRule(HABApp.Rule):

    def __init__(self):
        super().__init__()

        self.execute_python( self.func_when_finished, '/path/to/python/script.py', 'arg1_
↪for_script')

    def func_when_finished(self, module_output: str):
        print(module_output)

MyExecutionRule()
```

### 6.4.3 FinishedProcessInfo

It's possible to get the raw process output instead of just the captured string. See `execute_subprocess()` or `execute_python()` on how to enable it.

**class FinishedProcessInfo**(*returncode, stdout, stderr*)

Information about the finished process.

#### Variables

- **returncode** (*int*) – Return code of the process

- `stdout` (*Optional[str]*) – Standard output of the process or None
- `stderr` (*Optional[str]*) – Error output of the process or None

## 6.5 How to properly use rules from other rule files

This example shows how to properly get a rule during runtime and execute one of its function. With the proper import and type hint this method provides syntax checks and auto complete.

Rule instances can be accessed by their name (typically the class name). In the `HABApp.log` you can see the name when the rule is loaded. If you want to assign a custom name, you can change the rule name easily by assigning it to `self.rule_name` in `__init__`.

---

**Important:** Always look up rule every time, never assign to a class member! The rule might get reloaded and then the class member will still point to the old unloaded instance.

---

*rule\_a.py:*

```
import HABApp

class ClassA(HABApp.Rule):
    ...

    def function_a(self):
        ...

ClassA()
```

*rule\_b.py:*

```
import HABApp
import typing

if typing.TYPE_CHECKING:
    from .rule_a import ClassA    # This is only here to allow
                                # type hints for the IDE

class ClassB(HABApp.Rule):
    ...

    def function_b(self):

        r = self.get_rule('ClassA') # type: ClassA
        # The comment "# type: ClassA" will signal the IDE that the value returned from
        ↪ the
        # function is an instance of ClassA and thus provide checks and auto complete.

        # this calls the function on the instance
        r.function_a()
```



## 6.6 All available functions

**class Rule**

### Variables

- **async\_http** – *Async http connections*
- **mqtt** – *MQTT interaction*
- **openhabs** – *openhabs interaction*
- **oh** – short alias for *openhabs*

**on\_rule\_loaded()**

Override this to implement logic that will be called when the rule and the file has been successfully loaded

**on\_rule\_removed()**

Override this to implement logic that will be called when the rule has been unloaded.

**post\_event(name, event)**

Post an event to the event bus

### Parameters

- **name** (`Union[TypeVar(HINT_ITEM_OBJ, bound= BaseItem), str]`) – name or item to post event to
- **event** (`Any`) – Event class to be used (must be class instance)

### Returns

**listen\_event(name, callback, event\_filter=None)**

Register an event listener

### Parameters

- **name** (`Union[TypeVar(HINT_ITEM_OBJ, bound= BaseItem), str]`) – item or name to listen to
- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound= EventFilterBase)]`) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

### Return type

`TypeVar(HINT_EVENT_BUS_LISTENER, bound= EventBusListener)`

**execute\_subprocess(callback, program, \*args, additional\_python\_path=None, capture\_output=True, raw\_info=False, \*\*kwargs)**

Run another program

### Parameters

- **callback** – Function that will be called when the process has finished. First parameter takes a `str` when `raw_info` is `False` (default) else an instance of *FinishedProcessInfo*
- **program** (`Union[str, Path]`) – python module (path to file) or python package

- **args** (`Union[str, Path]`) – arguments passed to the module or to package
- **raw\_info** (`bool`) – `False`: Return only the textual process output. In case of failure (return code `!= 0`) a log entry and an error event will be created. This is the default and should be fine for almost all use cases.  
  
`True`: The callback will always be called with an instance of `FinishedProcessInfo`.
- **capture\_output** (`bool`) – Capture program output, set to `False` to only capture the return code
- **additional\_python\_path** (`Optional[Iterable[Union[str, Path]]]`) – additional folders which will be added to the env variable `PYTHONPATH`
- **kwargs** – Additional kwargs that will be passed to `asyncio.create_subprocess_exec`

#### Returns

**execute\_python**(*callback, module\_or\_package, \*args, additional\_python\_path=None, capture\_output=True, raw\_info=False, \*\*kwargs*)

Run a python module or package as a new process. The python environment that is used to run HABApp will be to run the module or package.

#### Parameters

- **callback** – Function that will be called when the process has finished. First parameter takes a `str` when `raw_info` is `False` (default) else an instance of `FinishedProcessInfo`
- **module\_or\_package** (`Union[str, Path]`) – python module (path to file) or python package (just the name)
- **args** (`Union[str, Path]`) – arguments passed to the module or to package
- **raw\_info** (`bool`) – `False`: Return only the textual process output. In case of failure (return code `!= 0`) a log entry and an error event will be created. This is the default and should be fine for almost all use cases.  
  
`True`: The callback will always be called with an instance of `FinishedProcessInfo`.
- **capture\_output** (`bool`) – Capture program output, set to `False` to only capture the return code
- **additional\_python\_path** (`Optional[Iterable[Union[str, Path]]]`) – additional folders which will be added to the env variable `PYTHONPATH`
- **kwargs** – Additional kwargs that will be passed to `asyncio.create_subprocess_exec`

#### Returns

**static get\_items**(*type=None, name=None, tags=None, groups=None, metadata=None, metadata\_value=None*)

Search the HABApp item registry and return the found items.

#### Parameters

- **type** (`Union[Tuple[Type[TypeVar(HINT_ITEM_OBJ, bound= BaseItem)], ...], Type[TypeVar(HINT_ITEM_OBJ, bound= BaseItem)], None]`) – item has to be an instance of this class
- **name** (`Union[str, Pattern[str], None]`) – `str` (will be compiled) or regex that is used to search the Name
- **tags** (`Union[str, Iterable[str], None]`) – item must have these tags (will return only instances of `OpenhabItem`)

- **groups** (`Union[str, Iterable[str], None]`) – item must be a member of these groups (will return only instances of `OpenhabItem`)
- **metadata** (`Union[str, Pattern[str], None]`) – str (will be compiled) or regex that is used to search the metadata (e.g. ‘homekit’)
- **metadata\_value** (`Union[str, Pattern[str], None]`) – str (will be compiled) or regex that is used to search the metadata value (e.g. ‘TargetTemperature’)

**Return type**

`Union[List[TypeVar(HINT_ITEM_OBJ, bound= BaseItem)], List[BaseItem]]`

**Returns**

Items that match all the passed criteria



## PARAMETERS

### 7.1 Parameters

Parameters are values which can easily be changed without having to reload the rules. Values will be picked up during runtime as soon as they get edited in the corresponding file. If the file doesn't exist yet it will automatically be generated in the configured param folder. Parameters are perfect for boundaries (e.g. if value is below param switch something on). Currently there are *Parameter* and *DictParameter* available.

```
from HABApp import Rule, Parameter
from HABApp.core.events import ValueChangeEventFilter

class MyRuleWithParameters(Rule):
    def __init__(self):
        super().__init__()

        # construct parameter once, default_value can be anything
        self.min_value = Parameter( 'param_file_testrule', 'min_value', default_value=10)

        # deeper structuring is possible through specifying multiple keys
        self.min_value_nested = Parameter(
            'param_file_testrule',
            'Rule A', 'subkey1', 'subkey2',
            default_value=['a', 'b', 'c'] # defaults can also be dicts or lists
        )

        self.listen_event('test_item', self.on_change_event, ValueChangeEventFilter())

    def on_change_event(self, event):

        # the parameter can be used like a normal variable, comparison works as expected
        if self.min_value < event.value:
            pass

        # The current value can be accessed through the value-property, but don't cache_
        ↪ it!
        current_value = self.min_value.value

MyRuleWithParameters()
```

Created file:

```
min_value: 10
Rule A:
  subkey1:
    subkey2:
      - a
      - b
      - c
```

Changes in the file will be automatically picked up through *Parameter*.

## 7.2 Validation

Since parameters used to provide flexible configuration for automation classes they can get quite complex and error prone. Thus it is possible to provide a validator for a file which will check the files for constraints, missing keys etc. when the file is loaded.

**set\_file\_validator**(*filename*, *validator*, *allow\_extra\_keys=True*)

Add a validator for the parameter file. If the file is already loaded this will reload the file.

### Parameters

- **filename** (*str*) – filename which shall be validated (without extension)
- **validator** (*Any*) – Description of file content - see the library *voluptuous* for examples. Use *None* to remove validator.
- **allow\_extra\_keys** – Allow additional keys in the file structure

Example

```
import HABApp
import voluptuous

# Validator can even and should be specified before loading rules

# allows a dict e.g. { 'key1': { 'key2': '5' }}
HABApp.parameters.set_file_validator('file1', {str: {str: int}})

# More complex example with an optional key:
validator = {
    'Test': int,
    'Key': {
        'mandatory_key': str,
        voluptuous.Optional('optional'): int
    }
}
HABApp.parameters.set_file_validator('file1', validator)
```

## 7.3 Create rules from Parameters

Parameters are not bound to rule instance and thus work everywhere in the rule file. It is possible to dynamically create rules from the contents of the parameter file.

It's even possible to automatically reload rules if the parameter file has changed: Just add the “reloads on” entry to the file.

Listing 1: my\_param.yml

```
key1:
  v: 10
key2:
  v: 12
```

rule

```
import HABApp

class MyRule(HABApp.Rule):
    def __init__(self, k, v):
        super().__init__()

        print(f'{k}: {v}')

cfg = HABApp.DictParameter('my_param')    # this will get the file content
for k, v in cfg.items():
    MyRule(k, v)
```

```
key1: {'v': 10}
key2: {'v': 12}
```

## 7.4 Parameter classes

**class** `Parameter(filename, *keys, default_value='ToDo')`

**property value:** `Any`

Return the current value. This will do the lookup so make sure to not cache this value, otherwise the parameter might not work as expected.

**class** `DictParameter(filename, *keys, default_value='ToDo')`

Implements a dict interface

**property value:** `dict`

Return the current value. This will do the lookup so make sure to not cache this value, otherwise the parameter might not work as expected.





This page describes the HABApp internals

## 8.1 Datatypes

HABApp provides some datatypes that simplify e.g. the color handling.

### 8.1.1 RGB

Datatype for RGB (red, green, blue) color handling. RGB types can be sent directly to openHAB and will be converted accordingly. Additionally there are wider RGB types (e.g. RGB16, RGB32) available.

```
from HABApp.core.types import RGB

col = RGB(5, 15, 255)
print(col)

print(col.red)    # red value
print(col.r)      # short name for red value
print(col[0])     # access of red value through numeric index

new_col = col.replace(red=22)
print(new_col)
print(new_col.to_hsb())
```

```
RGB(5, 15, 255)
5
5
5
RGB(22, 15, 255)
HSB(241.75, 94.12, 100.00)
```

```
class RGB(r, g, b)
```

```
    classmethod from_hsb(obj)
```

Return new Object from a HSB object for a hsb tuple

**Parameters**

**obj** (`Union[HSB, Tuple[float, float, float]]`) – HSB object or tuple with HSB values

**Return type**

Self

**Returns**

new RGB object

**replace**(*r=None, g=None, b=None, red=None, green=None, blue=None*)

Create a new object with (optionally) replaced values.

**Parameters**

- **r** (*Optional[int]*) – new red value
- **red** (*Optional[int]*) – new red value
- **g** (*Optional[int]*) – new green value
- **green** (*Optional[int]*) – new green value
- **b** (*Optional[int]*) – new blue value
- **blue** (*Optional[int]*) – new blue value

**Return type**

Self

**to\_hsb()**

Create a new HSB object from this object

**Return type***HSB***Returns**

New HSB object

**property b:** *int*

blue value

**property blue:** *int*

blue value

**property g:** *int*

green value

**property green:** *int*

green value

**property r:** *int*

red value

**property red:** *int*

red value

### 8.1.2 HSB

Datatype for HSB (hue, saturation, brightness) color handling. HSB types can be sent directly to openHAB and will be converted accordingly.

```
from HABApp.core.types import HSB

col = HSB(200, 25, 75)
print(col)

print(col.hue)    # hue value
print(col.h)      # short name for hue value
print(col[0])     # access of hue value through numeric index

new_col = col.replace(hue=22)
print(new_col)
print(new_col.to_rgb())
```

```
HSB(200.00, 25.00, 75.00)
200
200
200
HSB(22.00, 25.00, 75.00)
RGB(191, 161, 143)
```

**class** `HSB(hue, saturation, brightness)`

**classmethod** `from_rgb(obj)`

Create an HSB object from an RGB object or an RGB tuple

**Parameters**

**obj** (`Union[RGB, Tuple[int, int, int]]`) – HSB object or RGB tuple

**Return type**

`Self`

**Returns**

New HSB object

**replace**(*h=None, s=None, b=None, hue=None, saturation=None, brightness=None*)

Create a new object with (optionally) replaced values.

**Parameters**

- **h** (`Optional[float]`) – New hue value
- **hue** (`Optional[float]`) – New hue value
- **s** (`Optional[float]`) – New saturation value
- **saturation** (`Optional[float]`) – New saturation value
- **b** (`Optional[float]`) – New brightness value
- **brightness** (`Optional[float]`) – New brightness value

**Return type**

`Self`

**to\_rgb()**

Create an RGB object from this object

**Return type**

*RGB*

**Returns**

New RGB object

**property b:** *float*

brightness value

**property brightness:** *float*

brightness value

**property h:** *float*

hue value

**property hue:** *float*

hue value

**property s:** *float*

saturation value

**property saturation:** *float*

saturation value

## 8.2 Items

### 8.2.1 Item



**class Item()**

Simple item, used to store values in HABApp

**classmethod get\_create\_item**(*name, initial\_value=None*)

Creates a new item in HABApp and returns it or returns the already existing one with the given name

**Parameters**

- **name** (*str*) – item name
- **initial\_value** – state the item will have if it gets created

**Return type**

*Item*

**Returns**

The item

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_value**(`default_value=None`)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

`Any`

**Returns**

value of the item

**listen\_event**(`callback, event_filter=None`)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`

**post\_value**(`new_value`)

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

**post\_value\_if**(`new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>, ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>, le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>, greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)`

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post

- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

#### **set\_value**(*new\_value*)

Set a new value without creating events on the event bus

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

#### Returns

*True* if state has changed

#### **watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

#### Parameters

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

#### Return type

*ItemNoChangeWatch*

#### Returns

The watch obj which can be used to cancel the watch

#### **watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

Timestamp of the last time when the item has been updated (read only)

**property name:** `str`

**Returns**

Name of the item (read only)

## 8.2.2 ColorItem



**class ColorItem()**

Item for dealing with color related values

**classmethod get\_create\_item**(*name*, *hue=0.0*, *saturation=0.0*, *brightness=0.0*)

Creates a new item in HABApp and returns it or returns the already existing one with the given name

**Parameters**

- **name** (`str`) – item name
- **initial\_value** – state the item will have if it gets created

**Returns**

item

**classmethod get\_item**(*name*)

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_rgb**(*max\_rgb\_value=255*)

Return a rgb equivalent of the color

**Parameters**

**max\_rgb\_value** – the max value for rgb, typically 255 (default) or 65.536

**Return type**

`Tuple[int, int, int]`

**Returns**

rgb tuple

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

`Any`

**Returns**

value of the item

**is\_off**()

Return true if item is off

**Return type**

`bool`

**is\_on**()

Return true if item is on

**Return type**

`bool`

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`

**post\_rgb**(*r, g, b, max\_rgb\_value=255*)

Set a new rgb value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

- **r** – red value
- **g** – green value



- **b** – blue value
- **max\_rgb\_value** – the max value for rgb, typically 255 (default) or 65.536

**Return type***ColorItem***Returns**

self

**post\_value**(hue=0.0, saturation=0.0, brightness=0.0)

Set a new value and post appropriate events on the HABApp event bus (ValueUpdateEvent, ValueChangeEvent)

**Parameters**

- **hue** – hue (in °)
- **saturation** – saturation (in %)
- **brightness** – brightness (in %)

**post\_value\_if**(new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type***bool***Returns***True* if the new value was posted else *False*

**set\_rgb**(*r*, *g*, *b*, *max\_rgb\_value*=255, *ndigits*=2)

Set a rgb value

**Parameters**

- **r** – red value
- **g** – green value
- **b** – blue value
- **max\_rgb\_value** – the max value for rgb, typically 255 (default) or 65.536
- **ndigits** (*Optional[int]*) – Round the hsb values to the specified digits, None to disable rounding

**Return type**

*ColorItem*

**Returns**

self

**set\_value**(*hue*=0.0, *saturation*=0.0, *brightness*=0.0)

Set the color value

**Parameters**

- **hue** – hue (in °)
- **saturation** – saturation (in %)
- **brightness** – brightness (in %)

**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (*Union[int, float, timedelta]*) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoChangeWatch*

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (*Union[int, float, timedelta]*) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoUpdateWatch*

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime**

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime**

**Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str**

**Returns**

Name of the item (read only)

### 8.2.3 AggregationItem

The aggregation item is an item which takes the values of another item in a time period as an input. It then allows to process these values and generate an aggregated output based on it. The item makes implementing time logic like “Has it been dark for the last hour?” or “Was there frost during the last six hours?” really easy. And since it is just like a normal item triggering on changes etc. is possible, too.

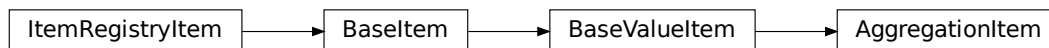
```
from HABApp.core.items import AggregationItem
my_agg = AggregationItem.get_create_item('MyAggregationItem')

# Connect the source item with the aggregation item
my_agg.aggregation_source('MyInputItem')

# Aggregate all changes in the last two hours
my_agg.aggregation_period(2 * 3600)

# Use max as an aggregation function
my_agg.aggregation_func(max)
```

The value of `my_agg` in the example will now always be the maximum of `MyInputItem` in the last two hours. It will automatically update and always reflect the latest changes of `MyInputItem`.



**class AggregationItem()**

**aggregation\_func(func)**

Set the function which will be used to aggregate all values. E.g. min or max

**Parameters**

**func** (Callable[[Iterable], Any]) – The function which takes an iterator and returns an aggregated value. Important: the function must be **non blocking**!

**Return type**

*AggregationItem*

**aggregation\_period**(*period*)

Set the period in which the items will be aggregated

**Parameters**

**period** (`Union[float, int, timedelta]`) – period in seconds

**Return type**

*AggregationItem*

**aggregation\_source**(*source, only\_changes=False*)

Set the source item which changes will be aggregated

**Parameters**

- **source** (`Union[BaseValueItem, str]`) – name or Item obj
- **only\_changes** (`bool`) – if true only value changes instead of value updates will be added

**Return type**

*AggregationItem*

**classmethod get\_create\_item**(*name*)

Creates a new *AggregationItem* in HABApp and returns it or returns the already existing item with the given name

**Parameters**

**name** (`str`) – item name

**Returns**

item

**classmethod get\_item**(*name*)

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from open-hab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

**Return type**`TypeVar(HINT_EVENT_BUS_LISTENER, bound= EventBusListener)`**post\_value(new\_value)**

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

**new\_value** – new value of the item

**Return type**`bool`**Returns**

True if state has changed

**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. `None`)
- **is\_not** – item state has to be not the same object as the passt value (e.g. `None`)

**Return type**`bool`**Returns**

*True* if the new value was posted else *False*

**set\_value(new\_value)**

Set a new value without creating events on the event bus

**Parameters**

**new\_value** – new value of the item

**Return type**`bool`**Returns**

True if state has changed

**watch\_change**(secs)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**`ItemNoChangeWatch`**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(secs)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**`ItemNoUpdateWatch`**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime****Returns**

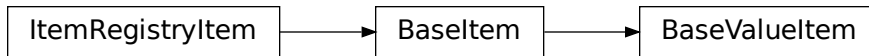
Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 8.2.4 BaseValueItem

Base class for items with values. All items that have a value must inherit from `BaseValueItem` May not be instantiated directly.



```
class BaseValueItem()
```

Simple item

#### Variables

- **name** (*str*) – Name of the item (read only)
- **value** – Value of the item, can be anything (read only)
- **last\_change** (*datetime*) – Timestamp of the last time when the item has changed the value (read only)
- **last\_update** (*datetime*) – Timestamp of the last time when the item has updated the value (read only)

```
classmethod get_item(name)
```

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

#### Parameters

**name** (*str*) – Name of the item

```
get_value(default_value=None)
```

Return the value of the item. This is a helper function that returns a default in case the item value is None.

#### Parameters

**default\_value** – Return this value if the item value is None

#### Return type

*Any*

#### Returns

value of the item

```
listen_event(callback, event_filter=None)
```

Register an event listener which listens to all event that the item receives

#### Parameters

- **callback** (*Callable*[[*Any*], *Any*]) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional*[*TypeVar*(*HINT\_EVENT\_FILTER\_OBJ*, bound=*EventFilterBase*)] – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from open-hab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

#### Return type

*TypeVar*(*HINT\_EVENT\_BUS\_LISTENER*, bound=*EventBusListener*)

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (ValueUpdateEvent, ValueChangeEvent)

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is\_*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

True if the new value was posted else False

**set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`



**Returns**

True if state has changed

**watch\_change(*secs*)**

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoChangeWatch*

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update(*secs*)**

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoUpdateWatch*

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

Timestamp of the last time when the item has been updated (read only)

**property name:** `str`

**Returns**

Name of the item (read only)

## 8.3 Events

### 8.3.1 ValueUpdateEvent

This event gets emitted every time a value of an item receives an update

ValueUpdateEvent

```
class ValueUpdateEvent(name, value)
```

**Variables**

- **name** (*str*) –
- **value** (*Any*) –

### 8.3.2 ValueChangeEvent

This event gets emitted every time a value of an item changes

ValueChangeEvent

```
class ValueChangeEvent(name, value, old_value)
```

**Variables**

- **name** (*str*) –
- **value** (*Any*) –
- **old\_value** (*Any*) –

### 8.3.3 ItemNoUpdateEvent

This event gets emitted when an item is watched for updates and no update has been made in a certain amount of time.

ItemNoUpdateEvent

```
class ItemNoUpdateEvent(name, seconds)
```

**Variables**

- **name** (*str*) –
- **seconds** (*Union[int, float]*) –

### 8.3.4 ItemNoChangeEvent

This event gets emitted when an item is watched for changes and no change has been made in a certain amount of time.

ItemNoChangeEvent

```
class ItemNoChangeEvent(name, seconds)
```

#### Variables

- **name** (*str*) –
- **seconds** (*Union[int, float]*) –



## 9.1 Additional configuration

For optimal performance it is recommended to use Basic Auth (available from openHAB 3.1 M3 on). It can be enabled through GUI or through textual configuration.

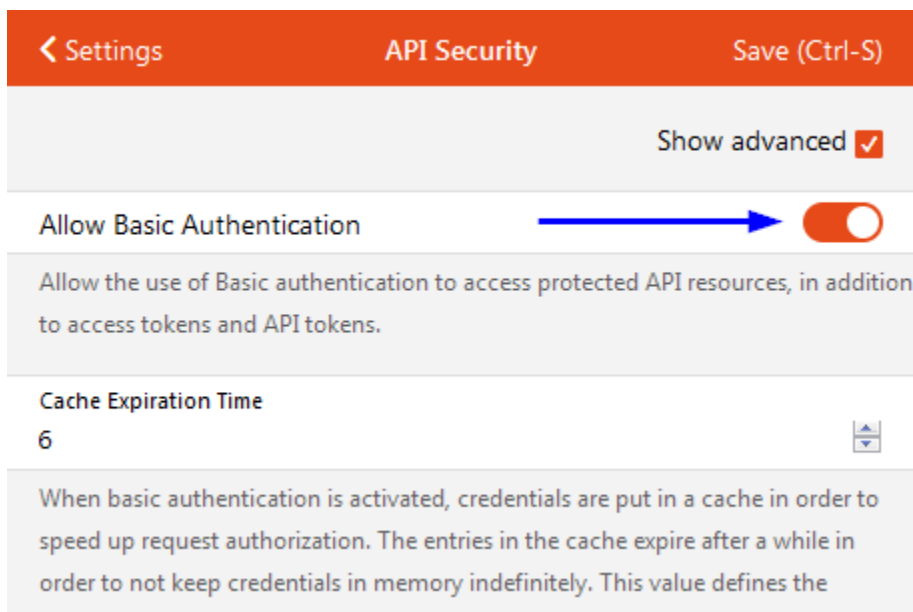
### 9.1.1 Textual configuration

The settings are in the `runtime.cfg`. Remove the `#` before the entry to activate it.

```
##### REST API #####  
org.openhab.restauth:allowBasicAuth=true
```

### 9.1.2 GUI

It can be enabled through the gui in settings -> API Security -> Allow Basic Authentication.



## 9.2 openHAB item types

### 9.2.1 Description and example

Items that are created from openHAB inherit all from `OpenhabItem` and provide convenience functions which simplify many things.

Example:

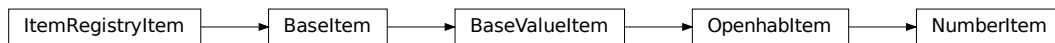
```
from HABApp.openhab.items import ContactItem, SwitchItem

my_contact = ContactItem.get_item('MyContact')
if my_contact.is_open():
    print('Contact is open!')

my_switch = SwitchItem.get_item('MySwitch')
if my_switch.is_on():
    my_switch.off()
```

```
Contact is open!
```

### 9.2.2 NumberItem



```
class NumberItem()
```

NumberItem which accepts and converts the data types from OpenHAB

#### Variables

- **name** (*str*) – Item name
- **value** (*Union[int, float]*) – Current item value (or state in openHAB wording)
- **label** (*Optional[str]*) – Item label or None if not configured
- **tags** (*FrozenSet[str]*) – Item tags
- **groups** (*FrozenSet[str]*) – The groups the item is in
- **metadata** (*Mapping[str, MetaData]*) – Item metadata

```
classmethod get_item(name)
```

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

#### Parameters

- **name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

#### Parameters

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

#### Parameters

**default\_value** – Return this value if the item value is None

#### Return type

*Any*

#### Returns

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

#### Parameters

- **callback** (*Callable[[Any], Any]*) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]*) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

#### Return type

*TypeVar(HINT\_EVENT\_BUS\_LISTENER, bound= EventBusListener)*

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

#### Parameters

**value** (*Any*) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value

- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***oh\_send\_command**(*value*=<MISSING>)

Send a command to the openHAB item

**Parameters****value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.**post\_value**(*new\_value*)Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value



- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoChangeWatch`**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoUpdateWatch***Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

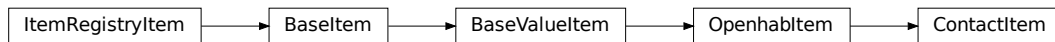
**property name: str****Returns**

Name of the item (read only)

**property unit: str | None**

Return the item unit if it is a “Unit of Measurement” item else None

### 9.2.3 ContactItem

**class ContactItem()****Variables**

- **name** (*str*) – Item name
- **value** (*str*) – Current item value (or state in openHAB wording)
- **label** (*Optional[str]*) – Item label or None if not configured
- **tags** (*FrozenSet[str]*) – Item tags
- **groups** (*FrozenSet[str]*) – The groups the item is in
- **metadata** (*Mapping[str, Metadata]*) – Item metadata

**closed()**

Post an update to the item with the closed value

**classmethod get\_item(name)**

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters****name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**is\_closed**()

Test value against closed value

**Return type**

*bool*

**is\_open**()

Test value against open value

**Return type**

*bool*

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (*Callable[[Any], Any]*) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]*) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

**Return type**

*TypeVar(HINT\_EVENT\_BUS\_LISTENER, bound= EventBusListener)*

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be posted. If not specified the current item value will be used.

```
oh_post_update_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
                  ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>,
                  lower_equal=<MISSING>, le=<MISSING>, greater_than=<MISSING>,
                  gt=<MISSING>, greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>,
                  is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

```
oh_send_command(value=<MISSING>)
```

Send a command to the openHAB item

#### Parameters

**value** (`Any`) – (optional) value to be sent. If not specified the current item value will be used.

```
open()
```

Post an update to the item with the open value

```
post_value(new_value)
```

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

**Returns**

True if state has changed

```
post_value_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
               ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>,
               le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>,
               greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

True if the new value was posted else False

```
set_value(new_value)
```

Set a new value without creating events on the event bus

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

```
watch_change(secs)
```

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoChangeWatch*

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update(secs)**

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoUpdateWatch*

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 9.2.4 SwitchItem

**class SwitchItem()**

`SwitchItem` which accepts and converts the data types from OpenHAB

**Variables**

- **name** (`str`) – Item name

- **value** (*str*) – Current item value (or state in openHAB wording)
- **label** (*Optional[str]*) – Item label or None if not configured
- **tags** (*FrozenSet[str]*) – Item tags
- **groups** (*FrozenSet[str]*) – The groups the item is in
- **metadata** (*Mapping[str, MetaData]*) – Item metadata

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**is\_off()**

Test value against off-value

**Return type**

*bool*

**is\_on()**

Test value against on-value

**Return type**

*bool*

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (*Callable[[Any], Any]*) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]*) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from open-hab or mqtt. Additionally it can be an instance of *EventFilter* which additionally

filters on the values of the event. It is also possible to group filters logically with, e.g. [AndFilterGroup](#) and [OrFilterGroup](#)

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound= EventBusListener)`

**off()**

Command item off

**oh\_post\_update(value=<MISSING>)**

Post an update to the openHAB item

**Parameters**

**value** ([Any](#)) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if(new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>)**

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

*True* if the new value was posted else *False*



**oh\_send\_command**(*value*=<MISSING>)

Send a command to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.

**on()**

Command item on

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (ValueUpdateEvent, ValueChangeEvent)

**Parameters**

**new\_value** – new value of the item

**Return type**

*bool*

**Returns**

True if state has changed

**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

*bool*

**Returns**

*True* if the new value was posted else *False*

**set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

**toggle**()

Toggle the switch. Turns the switch on when off or off when currently on.

**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoChangeWatch`

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

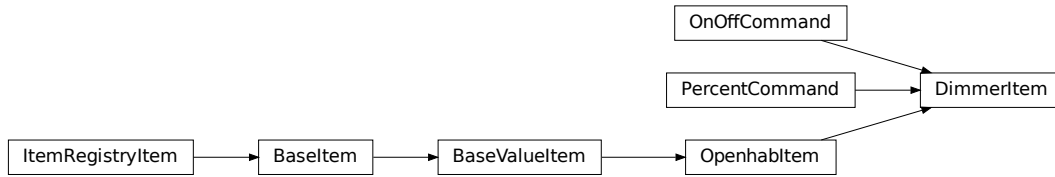
**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

### 9.2.5 DimmerItem



**class** `DimmerItem()`

DimmerItem which accepts and converts the data types from OpenHAB

#### Variables

- **name** (*str*) – Item name
- **value** (*Union[int, float]*) – Current item value (or state in openHAB wording)
- **label** (*Optional[str]*) – Item label or None if not configured
- **tags** (*FrozenSet[str]*) – Item tags
- **groups** (*FrozenSet[str]*) – The groups the item is in
- **metadata** (*Mapping[str, MetaData]*) – Item metadata

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

#### Parameters

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

#### Parameters

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

#### Parameters

**default\_value** – Return this value if the item value is None

#### Return type

*Any*

#### Returns

value of the item

**is\_off()**

Test value against off-value

**Return type**

`bool`

**is\_on()**

Test value against on-value

**Return type**

`bool`

**listen\_event**(*callback*, *event\_filter*=None)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound= EventBusListener)`

**off()**

Command item off

**oh\_post\_update**(*value*=<MISSING>)

Post an update to the openHAB item

**Parameters**

**value** (`Any`) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is\_*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value

- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***oh\_send\_command**(*value*=<MISSING>)

Send a command to the openHAB item

**Parameters****value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.**on()**

Command item on

**percent**(*value*)

Command to value (in percent)

**post\_value**(*new\_value*)Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed

**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value

- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoChangeWatch`**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

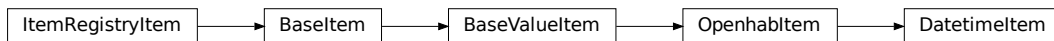
Timestamp of the last time when the item has been updated (read only)

**property name:** `str`

**Returns**

Name of the item (read only)

## 9.2.6 DatetimeItem



**class DatetimeItem()**

DatetimeItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (`str`) – Item name
- **value** (`datetime`) – Current item value (or state in openHAB wording)
- **label** (`Optional[str]`) – Item label or None if not configured
- **tags** (`FrozenSet[str]`) – Item tags
- **groups** (`FrozenSet[str]`) – The groups the item is in
- **metadata** (`Mapping[str, MetaData]`) – Item metadata

**classmethod get\_item(name)**

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_persistence\_data(persistence=None, start\_time=None, end\_time=None)**

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (`Optional[str]`) – name of the persistence service (e.g. rrd4j, mapdb).  
If not set default will be used
- **start\_time** (`Optional[datetime]`) – return only items which are newer than this

- **end\_time** (`Optional[datetime]`) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

`Any`

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (`Any`) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value



- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***oh\_send\_command**(*value*=<MISSING>)

Send a command to the openHAB item

**Parameters****value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.**post\_value**(*new\_value*)Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed

**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value

- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoChangeWatch`**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoUpdateWatch`**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

property `last_update`: `DateTime`

**Returns**

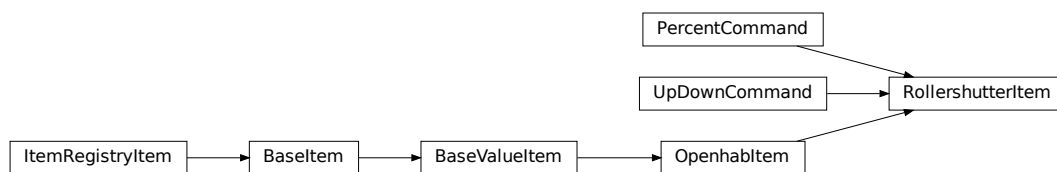
Timestamp of the last time when the item has been updated (read only)

property `name`: `str`

**Returns**

Name of the item (read only)

## 9.2.7 RollershutterItem



**class RollershutterItem()**

RollershutterItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (`str`) – Item name
- **value** (`Union[int, float]`) – Current item value (or state in openHAB wording)
- **label** (`Optional[str]`) – Item label or None if not configured
- **tags** (`FrozenSet[str]`) – Item tags
- **groups** (`FrozenSet[str]`) – The groups the item is in
- **metadata** (`Mapping[str, MetaData]`) – Item metadata

**down()**

Command down

**classmethod get\_item(name)**

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_persistence\_data(persistence=None, start\_time=None, end\_time=None)**

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (`Optional[str]`) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (`Optional[datetime]`) – return only items which are newer than this

- **end\_time** (`Optional[datetime]`) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

`Any`

**Returns**

value of the item

**is\_down**()

Test value against off-value

**Return type**

`bool`

**is\_up**()

Test value against on-value

**Return type**

`bool`

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (`Any`) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***oh\_send\_command**(*value*=<MISSING>)

Send a command to the openHAB item

**Parameters****value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.**percent**(*value*)

Command to value (in percent)

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (ValueUpdateEvent, ValueChangeEvent)

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed

**post\_value\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***set\_value(new\_value)**

Set a new value without creating events on the event bus

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**up()**

Command up

**watch\_change(secs)**

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoChangeWatch`**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(secs)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoUpdateWatch*

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

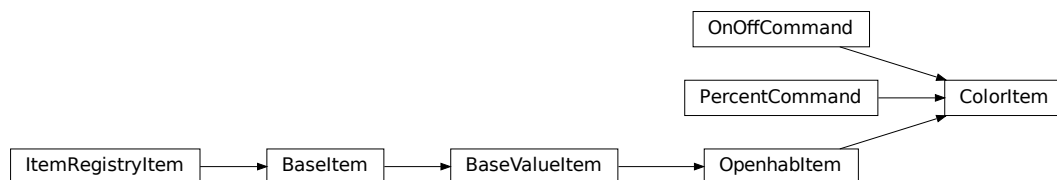
**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 9.2.8 ColorItem

**class ColorItem()**

ColorItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (*str*) – Item name
- **value** (*Tuple[float, float, float]*) – Current item value (or state in openHAB wording)
- **hue** (*float*) – Hue part of the value
- **saturation** (*float*) – Saturation part of the value
- **brightness** (*float*) – Brightness part of the value

- **label** (*Optional*[*str*]) – Item label or None if not configured
- **tags** (*FrozenSet*[*str*]) – Item tags
- **groups** (*FrozenSet*[*str*]) – The groups the item is in
- **metadata** (*Mapping*[*str*, *MetaData*]) – Item metadata

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional*[*str*]) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional*[*datetime*]) – return only items which are newer than this
- **end\_time** (*Optional*[*datetime*]) – return only items which are older than this

**get\_rgb**(*max\_rgb\_value=255*)

Return a rgb equivalent of the color

**Parameters**

**max\_rgb\_value** – the max value for rgb, typically 255 (default) or 65.536

**Return type**

*Tuple*[*int*, *int*, *int*]

**Returns**

rgb tuple

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**is\_off**()

Return true if item is off

**Return type**

*bool*

**is\_on**()

Return true if item is on

**Return type**

*bool*



**listen\_event**(*callback*, *event\_filter*=None)

Register an event listener which listens to all event that the item receives

#### Parameters

- **callback** (Callable[[Any], Any]) – callback that accepts one parameter which will contain the event
- **event\_filter** (Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]) – Event filter. This is typically [ValueUpdateEventFilter](#) or [ValueChangeEventFilter](#) which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of [EventFilter](#) which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. [AndFilterGroup](#) and [OrFilterGroup](#)

#### Return type

TypeVar(HINT\_EVENT\_BUS\_LISTENER, bound= EventBusListener)

**off()**

Command item off

**oh\_post\_update**(*value*=<MISSING>)

Post an update to the openHAB item

#### Parameters

**value** (Any) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is\_*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value

- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

**oh\_send\_command**(*value=<MISSING>*)

Send a command to the openHAB item

#### Parameters

**value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.

**on()**

Command item on

**percent**(*value*)

Command to value (in percent)

**post\_rgb**(*r, g, b, max\_rgb\_value=255*)

Set a new rgb value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

#### Parameters

- **r** – red value
- **g** – green value
- **b** – blue value
- **max\_rgb\_value** – the max value for rgb, typically 255 (default) or 65.536

#### Return type

`ColorItem`

#### Returns

`self`

**post\_value**(*hue=0.0, saturation=0.0, brightness=0.0*)

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

#### Parameters

- **hue** – hue (in °)
- **saturation** – saturation (in %)
- **brightness** – brightness (in %)

**post\_value\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post

- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***set\_rgb**(*r*, *g*, *b*, *max\_rgb\_value*=255, *ndigits*=2)

Set a rgb value

**Parameters**

- **r** – red value
- **g** – green value
- **b** – blue value
- **max\_rgb\_value** – the max value for rgb, typically 255 (default) or 65.536
- **ndigits** (`Optional[int]`) – Round the hsb values to the specified digits, None to disable rounding

**Return type**`ColorItem`**Returns***self***set\_value**(*hue*=0.0, *saturation*=0.0, *brightness*=0.0)

Set the color value

**Parameters**

- **hue** – hue (in °)
- **saturation** – saturation (in %)
- **brightness** – brightness (in %)

**watch\_change(*secs*)**

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoChangeWatch*

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update(*secs*)**

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoUpdateWatch*

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

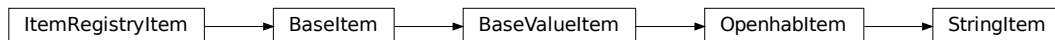
**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 9.2.9 StringItem

**class StringItem()**

StringItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (*str*) – Item name
- **value** (*str*) – Current item value (or state in openHAB wording)
- **label** (*Optional[str]*) – Item label or None if not configured
- **tags** (*FrozenSet[str]*) – Item tags
- **groups** (*FrozenSet[str]*) – The groups the item is in
- **metadata** (*Mapping[str, MetaData]*) – Item metadata

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (*Callable[[Any], Any]*) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]*) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

**Return type**

*TypeVar*(*HINT\_EVENT\_BUS\_LISTENER*, bound= *EventBusListener*)

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value*, \*, *equal*=<MISSING>, *eq*=<MISSING>, *not\_equal*=<MISSING>, *ne*=<MISSING>, *lower\_than*=<MISSING>, *lt*=<MISSING>, *lower\_equal*=<MISSING>, *le*=<MISSING>, *greater\_than*=<MISSING>, *gt*=<MISSING>, *greater\_equal*=<MISSING>, *ge*=<MISSING>, *is\_*=<MISSING>, *is\_not*=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

*bool*

**Returns**

*True* if the new value was posted else *False*

**oh\_send\_command**(*value*=<MISSING>)

Send a command to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (ValueUpdateEvent, ValueChangeEvent)

**Parameters**

**new\_value** – new value of the item

**Return type**

*bool*

**Returns**

True if state has changed

```
post_value_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
               ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>,
               le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>,
               greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

True if the new value was posted else False

```
set_value(new_value)
```

Set a new value without creating events on the event bus

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

```
watch_change(secs)
```

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoChangeWatch*

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update(secs)**

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

*ItemNoUpdateWatch*

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

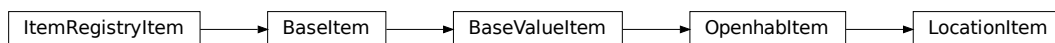
**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 9.2.10 LocationItem

**class LocationItem()**

LocationItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (*str*) – Item name
- **value** (*Optional[Tuple[float, float, Optional[float]]]*) – Current item value (or state in openHAB wording)



- **label** (*Optional*[*str*]) – Item label or None if not configured
- **tags** (*FrozenSet*[*str*]) – Item tags
- **groups** (*FrozenSet*[*str*]) – The groups the item is in
- **metadata** (*Mapping*[*str*, *MetaData*]) – Item metadata

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional*[*str*]) – name of the persistence service (e.g. *rrd4j*, *mapdb*). If not set default will be used
- **start\_time** (*Optional*[*datetime*]) – return only items which are newer than this
- **end\_time** (*Optional*[*datetime*]) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (*Callable*[[*Any*], *Any*]) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional*[*TypeVar*(*HINT\_EVENT\_FILTER\_OBJ*, bound=*EventFilterBase*)] – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

**Return type**

*TypeVar*(*HINT\_EVENT\_BUS\_LISTENER*, bound=*EventBusListener*)

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be posted. If not specified the current item value will be used.

```
oh_post_update_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
                  ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>,
                  lower_equal=<MISSING>, le=<MISSING>, greater_than=<MISSING>,
                  gt=<MISSING>, greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>,
                  is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

```
oh_send_command(value=<MISSING>)
```

Send a command to the openHAB item

#### Parameters

**value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.

```
post_value(new_value)
```

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

#### Returns

*True* if state has changed

```
post_value_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
              ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>,
              le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>,
              greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

```
set_value(new_value)
```

Set a new value without creating events on the event bus

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

#### Returns

*True* if state has changed

```
watch_change(secs)
```

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

#### Parameters

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoChangeWatch***Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(secs)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (*Union*[int, float, timedelta]) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoUpdateWatch***Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 9.2.11 PlayerItem

**class PlayerItem()**

PlayerItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (*str*) – Item name
- **value** (*str*) – Current item value (or state in openHAB wording)
- **label** (*Optional*[*str*]) – Item label or None if not configured
- **tags** (*FrozenSet*[*str*]) – Item tags
- **groups** (*FrozenSet*[*str*]) – The groups the item is in

- **metadata** (*Mapping[str, MetaData]*) – Item metadata

**classmethod** **get\_item**(*name*)

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (*Callable[[Any], Any]*) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]*) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

**Return type**

*TypeVar*(HINT\_EVENT\_BUS\_LISTENER, bound= EventBusListener)

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

*True* if the new value was posted else *False*

**oh\_send\_command**(*value=<MISSING>*)

Send a command to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

*True* if state has changed

**post\_value\_if**(*new\_value*, \*, *equal=<MISSING>*, *eq=<MISSING>*, *not\_equal=<MISSING>*,  
*ne=<MISSING>*, *lower\_than=<MISSING>*, *lt=<MISSING>*, *lower\_equal=<MISSING>*,  
*le=<MISSING>*, *greater\_than=<MISSING>*, *gt=<MISSING>*,  
*greater\_equal=<MISSING>*, *ge=<MISSING>*, *is=<MISSING>*, *is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

#### **set\_value**(*new\_value*)

Set a new value without creating events on the event bus

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

#### Returns

True if state has changed

#### **watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

#### Parameters

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

#### Return type

`ItemNoChangeWatch`

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(secs)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

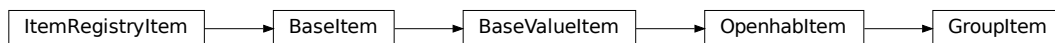
Timestamp of the last time when the item has been updated (read only)

**property name:** `str`

**Returns**

Name of the item (read only)

## 9.2.12 GroupItem

**class GroupItem()**

GroupItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (`str`) – Item name
- **value** (`Any`) – Current item value (or state in openHAB wording)
- **label** (`Optional[str]`) – Item label or None if not configured
- **tags** (`FrozenSet[str]`) – Item tags
- **groups** (`FrozenSet[str]`) – The groups the item is in
- **metadata** (`Mapping[str, Metadata]`) – Item metadata



**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (`Optional[str]`) – name of the persistence service (e.g. `rrd4j`, `mapdb`). If not set default will be used
- **start\_time** (`Optional[datetime]`) – return only items which are newer than this
- **end\_time** (`Optional[datetime]`) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

`Any`

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (`Any`) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***oh\_send\_command**(value=<MISSING>)

Send a command to the openHAB item

**Parameters****value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.**post\_value**(new\_value)

Set a new value and post appropriate events on the HABApp event bus (ValueUpdateEvent, ValueChangeEvent)

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**post\_value\_if**(new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns**

True if state has changed

**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats**Return type**`ItemNoChangeWatch`**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

Timestamp of the last time when the item has been updated (read only)

**property members:** `Tuple[OpenhabItem, ...]`

Resolves and then returns all group members

**property name:** `str`

**Returns**

Name of the item (read only)

### 9.2.13 ImageItem



**class ImageItem()**

ImageItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (`str`) – Item name
- **value** (`bytes`) – Current item value (or state in openHAB wording)
- **image\_type** (`Optional[str]`) – image type (e.g. jpg or png)
- **label** (`Optional[str]`) – Item label or None if not configured
- **tags** (`FrozenSet[str]`) – Item tags
- **groups** (`FrozenSet[str]`) – The groups the item is in
- **metadata** (`Mapping[str, MetaData]`) – Item metadata

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (`Optional[str]`) – name of the persistence service (e.g. `rrd4j`, `mapdb`). If not set default will be used
- **start\_time** (`Optional[datetime]`) – return only items which are newer than this
- **end\_time** (`Optional[datetime]`) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

`Any`

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`

**oh\_post\_update**(*data, img\_type=None*)

Post an update to an openHAB image with new image data. Image type is automatically detected, in rare cases when this does not work it can be set manually.

**Parameters**

- **data** (`bytes`) – image data
- **img\_type** (`Optional[str]`) – (optional) what kind of image, jpeg or png

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>)*

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

*True* if the new value was posted else *False*

**oh\_send\_command**(*data*, *img\_type=None*)

Send a command to an openHAB image with new image data. Image type is automatically detected, in rare cases when this does not work it can be set manually.

**Parameters**

- **data** (`bytes`) – image data
- **img\_type** (`Optional[str]`) – (optional) what kind of image, jpeg or png

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

*True* if state has changed

```
post_value_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
              ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>,
              le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>,
              greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

```
set_value(new_value)
```

Set a new value without creating events on the event bus

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

#### Returns

*True* if state has changed

```
watch_change(secs)
```

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

#### Parameters

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoChangeWatch***Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(secs)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (*Union*[int, float, timedelta]) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoUpdateWatch***Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

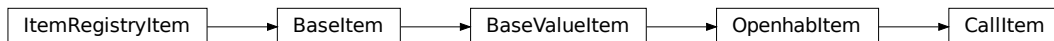
**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

## 9.2.14 CallItem

**class CallItem()**

CallItem which accepts and converts the data types from OpenHAB

**Variables**

- **name** (*str*) – Item name
- **value** (*Tuple*[*str*, ...]) – Current item value (or state in openHAB wording)
- **label** (*Optional*[*str*]) – Item label or None if not configured
- **tags** (*FrozenSet*[*str*]) – Item tags
- **groups** (*FrozenSet*[*str*]) – The groups the item is in



- **metadata** (*Mapping[str, MetaData]*) – Item metadata

**classmethod** **get\_item**(*name*)

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (*str*) – Name of the item

**get\_persistence\_data**(*persistence=None, start\_time=None, end\_time=None*)

Query historical data from the OpenHAB persistence service

**Parameters**

- **persistence** (*Optional[str]*) – name of the persistence service (e.g. rrd4j, mapdb). If not set default will be used
- **start\_time** (*Optional[datetime]*) – return only items which are newer than this
- **end\_time** (*Optional[datetime]*) – return only items which are older than this

**get\_value**(*default\_value=None*)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters**

**default\_value** – Return this value if the item value is None

**Return type**

*Any*

**Returns**

value of the item

**listen\_event**(*callback, event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (*Callable[[Any], Any]*) – callback that accepts one parameter which will contain the event
- **event\_filter** (*Optional[TypeVar(HINT\_EVENT\_FILTER\_OBJ, bound=EventFilterBase)]*) – Event filter. This is typically *ValueUpdateEventFilter* or *ValueChangeEventFilter* which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of *EventFilter* which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. *AndFilterGroup* and *OrFilterGroup*

**Return type**

*TypeVar*(*HINT\_EVENT\_BUS\_LISTENER*, bound= *EventBusListener*)

**oh\_post\_update**(*value=<MISSING>*)

Post an update to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be posted. If not specified the current item value will be used.

**oh\_post\_update\_if**(*new\_value, \*, equal=<MISSING>, eq=<MISSING>, not\_equal=<MISSING>, ne=<MISSING>, lower\_than=<MISSING>, lt=<MISSING>, lower\_equal=<MISSING>, le=<MISSING>, greater\_than=<MISSING>, gt=<MISSING>, greater\_equal=<MISSING>, ge=<MISSING>, is\_=<MISSING>, is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns**

*True* if the new value was posted else *False*

**oh\_send\_command**(*value=<MISSING>*)

Send a command to the openHAB item

**Parameters**

**value** (*Any*) – (optional) value to be sent. If not specified the current item value will be used.

**post\_value**(*new\_value*)

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

**new\_value** – new value of the item

**Return type**`bool`**Returns**

True if state has changed

**post\_value\_if**(*new\_value*, \*, *equal=<MISSING>*, *eq=<MISSING>*, *not\_equal=<MISSING>*,  
*ne=<MISSING>*, *lower\_than=<MISSING>*, *lt=<MISSING>*, *lower\_equal=<MISSING>*,  
*le=<MISSING>*, *greater\_than=<MISSING>*, *gt=<MISSING>*,  
*greater\_equal=<MISSING>*, *ge=<MISSING>*, *is=<MISSING>*, *is\_not=<MISSING>*)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

#### Parameters

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

#### Return type

`bool`

#### Returns

*True* if the new value was posted else *False*

#### **set\_value**(*new\_value*)

Set a new value without creating events on the event bus

#### Parameters

**new\_value** – new value of the item

#### Return type

`bool`

#### Returns

True if state has changed

#### **watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

#### Parameters

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

#### Return type

`ItemNoChangeWatch`

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(secs)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

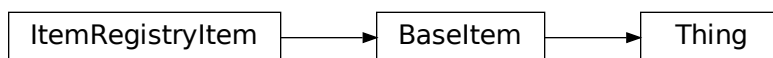
Timestamp of the last time when the item has been updated (read only)

**property name:** `str`

**Returns**

Name of the item (read only)

## 9.2.15 Thing



**class Thing**(name)

Base class for Things

**Variables**

- **status** (`ThingStatusEnum`) – Status of the thing (e.g. OFFLINE, ONLINE, ...)
- **status\_detail** (`ThingStatusDetailEnum`) – Additional detail for the status
- **status\_description** (`str`) – Additional description for the status
- **label** (`str`) – Thing label
- **location** (`str`) – Thing location
- **configuration** (`Mapping[str, Any]`) – Thing configuration
- **properties** (`Mapping[str, Any]`) – Thing properties

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**listen\_event**(*callback*, *event\_filter=None*)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound= EventBusListener)`

**set\_enabled**(*enable=True*)

Enable/disable the thing

**Parameters**

**enable** (`bool`) – True to enable, False to disable the thing

**Returns**

**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoChangeWatch`

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change:** `DateTime`

**Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update:** `DateTime`

**Returns**

Timestamp of the last time when the item has been updated (read only)

**property name:** `str`

**Returns**

Name of the item (read only)

## 9.3 Interaction with a openHAB

All interaction with the openHAB is done through the `self.oh` or `self.openhab` object in the rule or through an `OpenhabItem`.

### 9.3.1 Function parameters

**get\_thing**(*thing*)

Return the complete openHAB thing definition

**Parameters**

**thing** (`str` | `ItemRegistryItem`) – name of the thing or the item

**Returns**

openHAB thing

**set\_thing\_enabled**(*thing*, *enabled=True*)

Enable/disable a thing

**Parameters**

- **thing** (`str` | `ItemRegistryItem`) – name of the thing or the thing object
- **enabled** (`bool`) – True to enable thing, False to disable thing

**item\_exists**(*item*)

Check if an item exists in the openHAB item registry

**Parameters**

**item** (`str` | `ItemRegistryItem`) – name of the item or item

**Returns**

True if item was found

**get\_item**(*item*)

Return the complete openHAB item definition

**Parameters**

**item** (`str` | `ItemRegistryItem`) – name of the item or item

**Return type**

`ItemResp` | `None`

**Returns**

openHAB item

**remove\_item**(*item*)

Removes an item from the openHAB item registry

**Parameters**

**item** (*str* | ItemRegistryItem) – name

**Returns**

True if item was found and removed

**create\_item**(*item\_type*, *name*, *label=None*, *category=None*, *tags=None*, *groups=None*, *group\_type=None*, *group\_function=None*, *group\_function\_params=None*)

Creates a new item in the openHAB item registry or updates an existing one

**Parameters**

- **item\_type** (*str*) – item type
- **name** (*str*) – item name
- **label** (*Optional[str]*) – item label
- **category** (*Optional[str]*) – item category
- **tags** (*Optional[list[str]]*) – item tags
- **groups** (*Optional[list[str]]*) – in which groups is the item
- **group\_type** (*Optional[str]*) – what kind of group is it
- **group\_function** (*Optional[str]*) – group state aggregation function
- **group\_function\_params** (*Optional[list[str]]*) – params for group state aggregation

**Return type**

*bool*

**Returns**

True if item was created/updated

**set\_metadata**(*item*, *namespace*, *value*, *config*)

Add/set metadata to an item

**Parameters**

- **item** (*str* | ItemRegistryItem) – name of the item or item
- **namespace** (*str*) – namespace, e.g. stateDescription
- **value** (*str*) – value
- **config** (*dict*) – configuration e.g. {"options": "A,B,C"}

**Returns**

True if metadata was successfully created/updated

**remove\_metadata**(*item*, *namespace*)

Remove metadata from an item

**Parameters**

- **item** (*str* | ItemRegistryItem) – name of the item or item
- **namespace** (*str*) – namespace

**Returns**

True if metadata was successfully removed

**get\_persistence\_services()**

Return all available persistence services

**get\_persistence\_data(*item*, *persistence*, *start\_time*, *end\_time*)**

Query historical data from the openHAB persistence service

**Parameters**

- **item** (`str` | `ItemRegistryItem`) – name of the persistent item
- **persistence** (`str` | `None`) – name of the persistence service (e.g. `rrd4j`, `mapdb`). If not set default will be used
- **start\_time** (`datetime` | `None`) – return only items which are newer than this
- **end\_time** (`datetime` | `None`) – return only items which are older than this

**Return type**

`OpenhabPersistenceData`

**Returns**

last stored data from persistency service

**set\_persistence\_data(*item*, *persistence*, *time*, *state*)**

Set a measurement for a item in the persistence service

**Parameters**

- **item\_name** – name of the persistent item
- **persistence** (`str` | `None`) – name of the persistence service (e.g. `rrd4j`, `mapdb`). If not set default will be used
- **time** (`datetime`) – time of measurement
- **state** (`Any`) – state which will be set

**Returns**

True if data was stored in persistency service

**get\_link(*item*, *channel*)**

returns the link between an item and a (things) channel

**Parameters**

- **item** (`str` | `ItemRegistryItem`) – name of the item or item
- **channel** (`str`) – uid of the (things) channel (usually something like `AAAA:BBBBB:CCCCC:DDDD:0#SOME_NAME`)

**Return type**

`ItemChannelLinkResp`

**remove\_link(*item*, *channel*)**

removes a link between a (things) channel and an item

**Parameters**

- **item** (`str` | `ItemRegistryItem`) – name of the item or item
- **channel** (`str`) – uid of the (things) channel (usually something like `AAAA:BBBBB:CCCCC:DDDD:0#SOME_NAME`)



**Return type**`bool`**Returns**

True on successful removal, otherwise False

**create\_link**(*item*, *channel*, *configuration=None*)

creates a link between an item and a (things) channel

**Parameters**

- **item** (`str` | `ItemRegistryItem`) – name of the item or item
- **channel** (`str`) – uid of the (things) channel (usually something like AAAA:BBBBB:CCCCC:DDDD:0#SOME\_NAME)
- **configuration** (`Optional[dict[str, Any]]`) – optional configuration for the channel

**Return type**`bool`**Returns**

True on successful creation, otherwise False

**send\_command**(*item*, *command*)

Send the specified command to the item

**Parameters**

- **item** (`str` | `ItemRegistryItem`) – item name or item
- **command** (`Any`) – command

**post\_update**(*item*, *state*)

Post an update to the item

**Parameters**

- **item** (`str` | `ItemRegistryItem`) – item name or item
- **state** (`Any`) – new item state

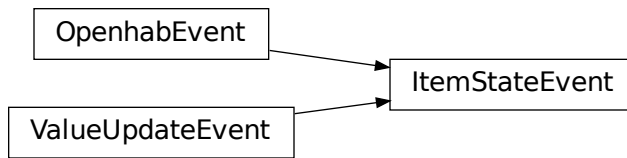
## 9.4 openHAB event types

openHAB produces various events that are mapped to the internal event bus. On the [openHAB page](#) there is an explanation for the various events.

### 9.4.1 Item events

#### ItemStateEvent

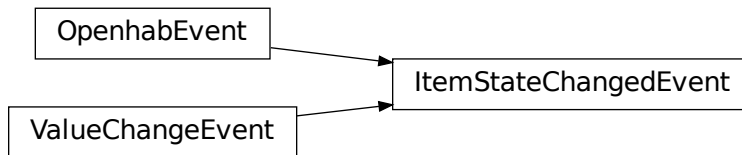
Since this event inherits from `ValueUpdateEvent` you can listen to `ValueUpdateEvent` and it will also trigger for `ItemStateEvent`.



```
class ItemStateEvent(name, value)
```

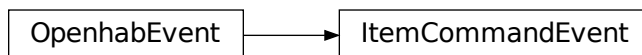
### ItemStateChangedEvent

Since this event inherits from *ValueChangeEvent* you can listen to *ValueChangeEvent* and it will also trigger for *ItemStateChangedEvent*.



```
class ItemStateChangedEvent(name, value, old_value)
```

### ItemCommandEvent



```
class ItemCommandEvent(name, value)
```

#### Variables

- **name** (*str*) –
- **value** (*Any*) –

## ItemAddedEvent



```
class ItemAddedEvent(name, type, label, tags, group_names)
```

### Variables

- **name** (*str*) –
- **type** (*str*) –
- **label** (*Optional[str]*) –
- **tags** (*FrozenSet[str]*) –
- **groups** (*FrozenSet[str]*) –

## ItemUpdatedEvent



```
class ItemUpdatedEvent(name, type, label, tags, group_names)
```

### Variables

- **name** (*str*) –
- **type** (*str*) –
- **label** (*Optional[str]*) –
- **tags** (*FrozenSet[str]*) –
- **groups** (*FrozenSet[str]*) –

## ItemRemovedEvent

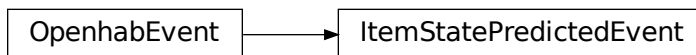


```
class ItemRemovedEvent(name)
```

### Variables

- **name** (*str*) –

## ItemStatePredictedEvent

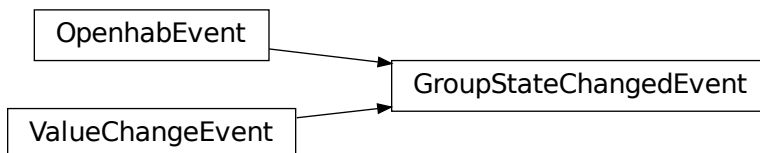


```
class ItemStatePredictedEvent(name, value)
```

### Variables

- **name** (*str*) –
- **value** (*Any*) –

## GroupStateChangedEvent



```
class GroupStateChangedEvent(name, item, value, old_value)
```

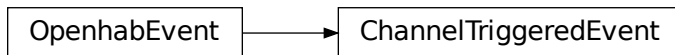
### Variables

- **name** (*str*) –

- `item (str)` –
- `value (Any)` –
- `old_value (Any)` –

### 9.4.2 Channel events

#### ChannelTriggeredEvent



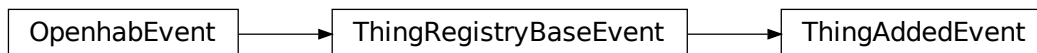
```
class ChannelTriggeredEvent(name="", event="", channel="")
```

##### Variables

- `name (str)` –
- `event (str)` –
- `channel (str)` –

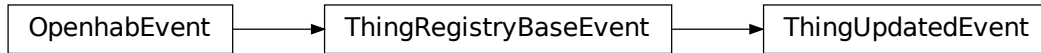
### 9.4.3 Thing events

#### ThingAddedEvent



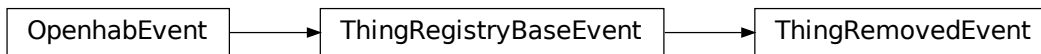
```
class ThingAddedEvent(name, thing_type, label, location, channels, configuration, properties)
```

## ThingUpdatedEvent



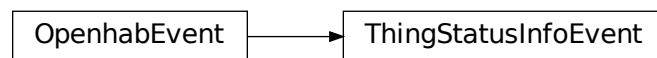
```
class ThingUpdatedEvent(name, thing_type, label, location, channels, configuration, properties)
```

## ThingRemovedEvent



```
class ThingRemovedEvent(name, thing_type, label, location, channels, configuration, properties)
```

## ThingStatusInfoEvent

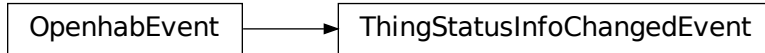


```
class ThingStatusInfoEvent(name="", status=ThingStatusEnum.UNINITIALIZED,  
                           detail=ThingStatusDetailEnum.NONE, description="")
```

### Variables

- **name** (*str*) –
- **status** (*ThingStatusEnum*) –
- **detail** (*ThingStatusDetailEnum*) –
- **description** (*str*) –

## ThingStatusInfoChangedEvent



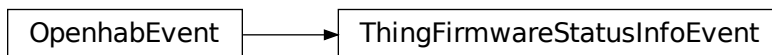
```

class ThingStatusInfoChangedEvent(name="", status=ThingStatusEnum.UNINITIALIZED,
                                   detail=ThingStatusDetailEnum.NONE, description="",
                                   old_status=ThingStatusEnum.UNINITIALIZED,
                                   old_detail=ThingStatusDetailEnum.NONE, old_description="")
  
```

### Variables

- **name** (*str*) –
- **status** (*ThingStatusEnum*) –
- **detail** (*ThingStatusDetailEnum*) –
- **description** (*str*) –
- **old\_status** (*ThingStatusEnum*) –
- **old\_detail** (*ThingStatusDetailEnum*) –
- **old\_description** (*str*) –

## ThingFirmwareStatusInfoEvent



```

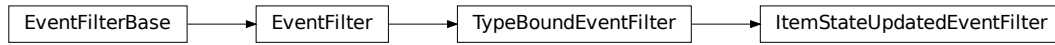
class ThingFirmwareStatusInfoEvent(name="", status="")
  
```

### Variables

- **name** (*str*) –
- **status** (*str*) –

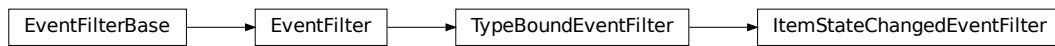
## 9.4.4 Event filters

### ItemStateUpdatedEventFilter



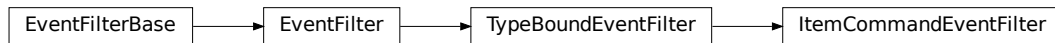
```
class ItemStateUpdatedEventFilter(value=<MISSING>)
```

### ItemStateChangedEventFilter



```
class ItemStateChangedEventFilter(value=<MISSING>, old_value=<MISSING>)
```

### ItemCommandEventFilter



```
class ItemCommandEventFilter(value=<MISSING>)
```



## 9.5 Transformations

From openHAB 4 on it's possible to use the existing transformations in HABApp. Transformations are loaded every time when HABApp connects to openHAB. OpenHAB does not issue an event when the transformations change so in order for HABApp to pick up the changes either HABApp or openHAB has to be restarted. Available transformations are logged on connect.

### 9.5.1 map

The `map transformation` is returned as a dict. If the map transformation is defined with a default the default is used accordingly.

Example:

```
from HABApp.openhab import transformations

TEST_MAP = transformations.map['test.map'] # load the transformation, can be used
↪ anywhere
print(TEST_MAP['test_key'])                # It's a normal dict with keys as str and
↪ values as str

# if all keys or values are numbers they are automatically casted to an int
NUMBERS = transformations.map['numbers.map']
print(NUMBERS[1]) # Note that the key is an int
```

```
test_value
test number meaning
```

## 9.6 Textual thing configuration

### 9.6.1 Description

HABApp offers a special mechanism to textually define thing configuration parameters and linked items for things which have been added through the gui. This combines the best of both worlds: auto discovery, easy and fast sharing of parameters and items across things.

Configuration is done in the `thing_your_name.yml` file in the `config` folder (see [Configuration](#)). Every file that starts with `thing_` has the `.yml` ending will be loaded.

The Parameters and items will be checked/set when HABApp connects to openHAB or whenever the corresponding file gets changed.

## 9.6.2 Principle of operation

All existing things from openHAB can be filtered by different criteria. For each one of these remaining things it is then possible to

- Set thing parameters
  - Create items with values taken from the thing fields
  - Apply filters to the channels of the thing
- For each matching channel it is possible to create and link items with values taken from the thing and the matching channel values

There is also a test mode which prints out all required information and does not make any changes.

A valid `.items` file will automatically be created next to the `.yaml` file containing all created items. It can be used to get a quick overview what items (would) have been created or copied into the items folder.

## 9.6.3 File Structure

Configuration is done through a `.yaml` file.

### Example

The following example will show how to set the Z-Wave Parameters 4, 5, 6 and 8 for a `Philio PST02A` Z-Wave sensor and how to automatically link items to it.

---

**Tip:** Integer values can be specified either as integer (20) or hex (0x14)

---

The entries `thing config`, `create items` and `channels` are optional and can be combined as desired.

```
# Test mode: will not do anything but instead print out information
test: True

# Define filters which will reduce the number of things,
# all defined filters have to match for further processing
filter:
  thing_type: zwave:philio_pst02a_00_000

# Set this configuration every matching thing. HABApp will automatically only
# change the values which are not already correct.
# Here it is the z-wave parameters which are responsible for the device behaviour
thing config:
  4: 99      # Light Threshold
  5: 8       # Operation Mode
  6: 4       # MultiSensor Function Switch
  7: 20      # Customer Function

# Create items for every matching thing
create items:
  - type: Number
    name: '{thing_label, :(.+)}$_MyNumber'      # Use the label from the thing as an
    ↪input for the name,
```

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```

    label: '{thing_label, :(.+)$} MyNumber [%d]'      # the regex will take everything from
↳ the ':' on until the end
    icon: battery

channels:
  # reduce the channels of the thing with these filters
  # and link items to it
  - filter:
      channel_type: zwave:alarm_motion
      link items:
        - type: Number
          name: '{thing_label, :(.+)$}_Movement'      # Use the label from the thing
↳ as an input for the name,
          label: '{thing_label, :(.+)$} Movement [%d %%]' # the regex will take
↳ everything from the ':' on until the end
          icon: battery
          groups: ['group1', 'group2']
          tags: ['tag1']

  - filter:
      channel_type: zwave:sensor_temperature
      link items:
        - type: Number
          name: '{thing_label, :(.+)$}_Temperature'
          label: '{thing_label, :(.+)$} Temperature [%d %%]'
          icon: battery

```

### Multiple filters and filter definitions in one file

It is possible to add multiple thing processors into one file. To achieve this the root entry is now a list.

Filters can also be lists e.g. if they have to be applied multiple times to the same field.

```

- test: True
  filter:
    thing_type: zwave:philio_pst02a_00_000
    ...

- test: True
  # multiple filters on the same field, all have to match
  filter:
    - thing_type: zwave:fibaro.+
    - thing_type: zwave:fibaro_fgrgbw_00_000
    ...

```

### 9.6.4 Thing configuration

With the `thing config` block it is possible to set a configuration for each matching thing. If the parameters are already correct, they will not be set again.

**Warning:** The value of the configuration parameters will not be checked and will be written as specified. It is recommended to use HABmin or PaperUI to generate the initial configuration and use this mechanism to spread it to things of the same type.

#### Example

```
thing config:
4: 99      # Light Threshold
5: 8       # Operation Mode
6: 4       # MultiSensor Function Switch
7: 20      # Customer Function
```

#### References to other parameters

It is possible to use references to mathematically build parameters from other parameters. Typically this would be fade duration and refresh interval. References to other parameter values can be created with `$`. Example:

```
thing config:
5: 8
6: '$5 / 2'      # Use value from parameter 5 and divide it by two.
7: 'int($5 / 2)' # it is possible to use normal python data conversions
```

### 9.6.5 Item configuration

Items can be configured under `create items -> []` and `channels -> [] -> link items -> []`.

#### Structure

Mandatory values are `type` and `name`, all other values are optional.

```
type: Number
name: my_name
label: my_label
icon: my_icon
groups: ['group1', 'group2']
tags: ['tag1', 'tag1']
```

## Metadata

It is possible to add metadata to the created items through the optional metadata entry in the item config.

There are two forms how metadata can be set. The implicit form for simple key-value pairs (e.g. autoupdate) or the explicit form where the entries are under value and config (e.g. alexa)

```
- type: Number
  name: '{thing_label, :(.+)$}_Temperature'
  label: '{thing_label, :(.+)$} Temperature [%d %%]'
  icon: battery
  metadata:
    autoupdate: 'false'
    homekit: 'TemperatureSensor'
    alexa:
      'value': 'Fan'
      'config':
        'type': 'oscillating'
        'speedSteps': 3
```

The config is equivalent to the following item configuration:

```
Number MyLabel_Temperature "MyLabel Temperature [%d %%]" { autoupdate="false", homekit=
  ↳ "TemperatureSensor", alexa="Fan" [ type="oscillating", speedSteps=3 ] }
```

## 9.6.6 Fields

### Filtering things/channels

The filter value can be applied to any available field from the Thing/Channel. The filter value is a regex that has to fully match the value.

Syntax:

```
filter:
  FIELD_NAME: REGULAR_EXPRESSION
```

e.g.

```
filter:
  thing_uid: zwave:device:controller:node35
```

If multiple filters are specified all have to match to select the Thing or Channel.

```
# Multiple filters on different columns
filter:
  thing_type: zwave:fibaro.+
  thing_uid: zwave:device:controller:node35

# Multiple filters on the same columns (rarely needed)
filter:
- thing_type: zwave:fibaro.+
- thing_type: zwave:fibaro_fgrgbw_00_000
```

### Field values as inputs

Filed values are available for item configuration and can be applied to all fields in the item configuration except for type and metadata.

### Syntax

Macros that select field values are framed with `{}` so the containing string has to be put in annotation marks. There are three modes of operation with wildcards:

1. Just insert the value from the field:  
`{field}`
2. Insert a part of the value from the field. A regular expression is used to extract the part and therefore has to contain a capturing group.  
`{field, regex(with_group)}`
3. Do a regex replace on the value from the field and use the result  
`{field, regex, replace}`

### Available fields

---

**Tip:** Test mode will show a table with all available fields and their value

---

The following fields are available for things:

- `thing_uid`
- `thing_type`
- `thing_location`
- `thing_label`
- `bridge_uid`

Additional available fields for channels:

- `channel_uid`
- `channel_type`
- `channel_label`
- `channel_kind`

## 9.6.7 Example

### Log output

This will show the output for the example from *File Structure*

```
Loading /config/thing_philio.yml!
```

```
+-----  
↔-----
```

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```

↪---+
|
↪Thing overview
↪
|
+-----+-----+-----+-----+
↪
↪---+
|          thing_uid          |          thing_type          | thing_location |
↪          thing_label        |          bridge_uid          |                |
↪editable |
+-----+-----+-----+-----+
↪
↪---+
| zwave:device:controller:node32 | zwave:fibaro_fgrgbw_00_000 | Room1          | Fibaro_
↪RGBW (Node 32): Room1 RGBW      | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node7  | zwave:fibaro_fgrgbw_00_000 | Room2          | Fibaro_
↪RGBW (Node 07): Room2 RGBW      | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node23 | zwave:fibaro_fgrgbw_00_000 | Room3          | Fibaro_
↪RGBW (Node 23): Room3 RGBW      | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node35 | zwave:philio_pst02a_00_000 | Room1          | Philio_
↪PST02A (Node 35): Room1 Door    | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node15 | zwave:philio_pst02a_00_000 | Room2          | Philio_
↪PST02A (Node 15): Room2 Window  | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node17 | zwave:philio_pst02a_00_000 | Room3          | Philio_
↪PST02A (Node 17): Room3 Window  | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node3   | zwave:philio_pst02a_00_000 | Room1          | Philio_
↪PST02A (Node 03): Room1 Window  | zwave:serial_zstick:controller |                | True
↪
| zwave:device:controller:node5   | zwave:philio_pst02a_00_000 | Room4          | Philio_
↪PST02A (Node 05): FrontDoor     | zwave:serial_zstick:controller |                | True
↪
| zwave:serial_zstick:controller | zwave:serial_zstick        |                | ZWave_
↪Controller                      |                            |                |
↪False
+-----+-----+-----+-----+
↪
↪---+
thing_type "zwave:philio_pst02a_00_000" matches for zwave:device:controller:node35!
thing_type "zwave:philio_pst02a_00_000" matches for zwave:device:controller:node15!
thing_type "zwave:philio_pst02a_00_000" matches for zwave:device:controller:node17!
thing_type "zwave:philio_pst02a_00_000" matches for zwave:device:controller:node3!
thing_type "zwave:philio_pst02a_00_000" matches for zwave:device:controller:node5!
+-----+-----+-----+-----+
↪
|                                     Current configuration
↪

```

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```

+-----+-----+-----+-----+
↪-----+-----+
|      Parameter      | controller:node35 | controller:node15 | controller:node17 | ↪
↪controller:node3 | controller:node5 |
+-----+-----+-----+-----+
↪-----+-----+
| 2                    | -1                | -1                | -1                | -
↪1                    | -1                |                   |                   |
| 3                    | 80                | 80                | 80                | ↪
↪80                   | 80                |                   |                   |
| 4                    | 99                | 99                | 99                | ↪
↪99                   | 99                |                   |                   |
| 5                    | 0                 | 8                 | 8                 | ↪
↪8                    | 8                 |                   |                   |
| 6                    | 4                 | 0                 | 0                 | ↪
↪0                    | 0                 |                   |                   |
| 7                    | 22                | 20                | 20                | ↪
↪20                   | 20                |                   |                   |
| 8                    | 3                 | 3                 | 3                 | ↪
↪3                    | 3                 |                   |                   |
| 9                    | 4                 | 0                 | 4                 | ↪
↪4                    | 4                 |                   |                   |
| 10                   | 12                | 12                | 12                | ↪
↪12                   | 12                |                   |                   |
| 11                   | 12                | 12                | 12                | ↪
↪12                   | 12                |                   |                   |
| 12                   | 12                | 12                | 2                 | ↪
↪12                   | 4                 |                   |                   |
| 13                   | 12                | 12                | 2                 | ↪
↪12                   | 4                 |                   |                   |
| 20                   | 30                | 30                | 30                | ↪
↪30                   | 30                |                   |                   |
| 21                   | 1                 | 0                 | 0                 | ↪
↪0                    | 0                 |                   |                   |
| 22                   | 0                 | 0                 | 0                 | ↪
↪0                    | 0                 |                   |                   |
| Group1               | ['controller']    | ['controller']    | ['controller']    | [
↪'controller']        | ['controller']    |                   |                   |
| Group2               | []                | []                | []                | ↪
↪[]                   | []                |                   |                   |
| binding_cmdrepollperiod | 1500              | 1500              | 1500              | ↪
↪1500                | 1500              |                   |                   |
| binding_pollperiod    | 86400             | 86400             | 86400             | ↪
↪86400               | 86400             |                   |                   |
| wakeup_interval       | 86400             | 86400             | 86400             | ↪
↪86400               | 86400             |                   |                   |
+-----+-----+-----+-----+
↪-----+-----+
Would set {5: 8, 7: 20} for zwave:device:controller:node35
Would set {6: 4} for zwave:device:controller:node15
Would set {6: 4} for zwave:device:controller:node17
Would set {6: 4} for zwave:device:controller:node3

```

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Would set {6: 4} for zwave:device:controller:node5

```

+-----+
|                                     Channels for zwave:philio_pst02a_00_000                                     |
+-----+
|                                     |
+-----+
|                                     |
+-----+
|                                     |
+-----+
| channel_label | channel_kind | channel_uid | channel_type |
+-----+
| zwave:device:controller:node35:sensor_door | zwave:sensor_door | Door/
↳ Window Sensor | STATE |
| zwave:device:controller:node35:alarm_motion | zwave:alarm_motion | Motion
↳ Sensor | STATE |
| zwave:device:controller:node35:alarm_tamper | zwave:alarm_tamper | Tamper
↳ Alarm | STATE |
| zwave:device:controller:node35:sensor_luminance | zwave:sensor_luminance | Sensor
↳ (luminance) | STATE |
| zwave:device:controller:node35:sensor_temperature | zwave:sensor_temperature | Sensor
↳ (temperature) | STATE |
| zwave:device:controller:node35:alarm_access | zwave:alarm_access | Alarm
↳ (Access Control) | STATE |
| zwave:device:controller:node35:alarm_burglar | zwave:alarm_burglar | Alarm
↳ (Burglar) | STATE |
| zwave:device:controller:node35:battery-level | system:battery-level |
↳ Batterieladung | STATE |
+-----+
channel_type "zwave:alarm_motion" matches for zwave:device:controller:node35:alarm_
↳ motion!
channel_type "zwave:sensor_temperature" matches for
↳ zwave:device:controller:node35:sensor_temperature!

channel_type "zwave:alarm_motion" matches for zwave:device:controller:node15:alarm_
↳ motion!
channel_type "zwave:sensor_temperature" matches for
↳ zwave:device:controller:node15:sensor_temperature!

channel_type "zwave:alarm_motion" matches for zwave:device:controller:node17:alarm_
↳ motion!
channel_type "zwave:sensor_temperature" matches for
↳ zwave:device:controller:node17:sensor_temperature!

channel_type "zwave:alarm_motion" matches for zwave:device:controller:node3:alarm_motion!
channel_type "zwave:sensor_temperature" matches for zwave:device:controller:node3:sensor_
↳ temperature!

channel_type "zwave:alarm_motion" matches for zwave:device:controller:node5:alarm_motion!
channel_type "zwave:sensor_temperature" matches for zwave:device:controller:node5:sensor_
↳ temperature!

```

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```

Would create Item(type='Number', name='Room1_Door_MyNumber', label='Room1 Door MyNumber [
↳ %d]', icon='battery', groups=[], tags=[], link=None)
Would create Item(type='Number', name='Room1_Door_Movement', label='Room1 Door Movement [
↳ %d %%]', icon='battery', groups=['group1', 'group2'], tags=['tag1'], link=
↳ 'zwave:device:controller:node35:alarm_motion')
Would create Item(type='Number', name='Room1_Door_Temperature', label='Room1 Door
↳ Temperature [%d %%]', icon='battery', groups=[], tags=[], link=
↳ 'zwave:device:controller:node35:sensor_temperature')
Would create Item(type='Number', name='Room2_Window_MyNumber', label='Room2 Window
↳ MyNumber [%d]', icon='battery', groups=[], tags=[], link=None)
Would create Item(type='Number', name='Room2_Window_Movement', label='Room2 Window
↳ Movement [%d %%]', icon='battery', groups=['group1', 'group2'], tags=['tag1'], link=
↳ 'zwave:device:controller:node15:alarm_motion')
Would create Item(type='Number', name='Room2_Window_Temperature', label='Room2 Window
↳ Temperature [%d %%]', icon='battery', groups=[], tags=[], link=
↳ 'zwave:device:controller:node15:sensor_temperature')
Would create Item(type='Number', name='Room3_Window_MyNumber', label='Room3 Window
↳ MyNumber [%d]', icon='battery', groups=[], tags=[], link=None)
Would create Item(type='Number', name='Room3_Window_Movement', label='Room3 Window
↳ Movement [%d %%]', icon='battery', groups=['group1', 'group2'], tags=['tag1'], link=
↳ 'zwave:device:controller:node17:alarm_motion')
Would create Item(type='Number', name='Room3_Window_Temperature', label='Room3 Window
↳ Temperature [%d %%]', icon='battery', groups=[], tags=[], link=
↳ 'zwave:device:controller:node17:sensor_temperature')
Would create Item(type='Number', name='Room1_Window_MyNumber', label='Room1 Window
↳ MyNumber [%d]', icon='battery', groups=[], tags=[], link=None)
Would create Item(type='Number', name='Room1_Window_Movement', label='Room1 Window
↳ Movement [%d %%]', icon='battery', groups=['group1', 'group2'], tags=['tag1'], link=
↳ 'zwave:device:controller:node3:alarm_motion')
Would create Item(type='Number', name='Room1_Window_Temperature', label='Room1 Window
↳ Temperature [%d %%]', icon='battery', groups=[], tags=[], link=
↳ 'zwave:device:controller:node3:sensor_temperature')
Would create Item(type='Number', name='FrontDoor_MyNumber', label='FrontDoor MyNumber [
↳ %d]', icon='battery', groups=[], tags=[], link=None)
Would create Item(type='Number', name='FrontDoor_Movement', label='FrontDoor Movement [
↳ %d %%]', icon='battery', groups=['group1', 'group2'], tags=['tag1'], link=
↳ 'zwave:device:controller:node5:alarm_motion')
Would create Item(type='Number', name='FrontDoor_Temperature', label='FrontDoor
↳ Temperature [%d %%]', icon='battery', groups=[], tags=[], link=
↳ 'zwave:device:controller:node5:sensor_temperature')

```

### Created items file

Number	Room1_Door_MyNumber	"Room1 Door MyNumber [%d]"	<battery>
Number	Room1_Door_Movement	"Room1 Door Movement [%d %%]"	<battery> ↳
	↳ (group1, group2) [tag1]	{channel = "zwave:device:controller:node35:alarm_motion"}	
Number	Room1_Door_Temperature	"Room1 Door Temperature [%d %%]"	<battery> ↳
	↳	{channel = "zwave:device:controller:node35:sensor_	
	↳ temperature"}		
Number	Room2_Window_MyNumber	"Room2 Window MyNumber [%d]"	<battery>

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```

Number    Room2_Window_Movement      "Room2 Window Movement [%d %]"      <battery>
↳(group1, group2)    [tag1]    {channel = "zwave:device:controller:node15:alarm_motion"}
Number    Room2_Window_Temperature   "Room2 Window Temperature [%d %]"    <battery>
↳
↳temperature"}
Number    Room3_Window_MyNumber       "Room3 Window MyNumber [%d]"         <battery>
Number    Room3_Window_Movement       "Room3 Window Movement [%d %]"      <battery>
↳(group1, group2)    [tag1]    {channel = "zwave:device:controller:node17:alarm_motion"}
Number    Room3_Window_Temperature    "Room3 Window Temperature [%d %]"    <battery>
↳
↳temperature"}
Number    Room1_Window_MyNumber       "Room1 Window MyNumber [%d]"         <battery>
Number    Room1_Window_Movement       "Room1 Window Movement [%d %]"      <battery>
↳(group1, group2)    [tag1]    {channel = "zwave:device:controller:node3:alarm_motion"}
Number    Room1_Window_Temperature    "Room1 Window Temperature [%d %]"    <battery>
↳
↳temperature"}
Number    FrontDoor_MyNumber          "FrontDoor MyNumber [%d]"           <battery>
Number    FrontDoor_Movement          "FrontDoor Movement [%d %]"         <battery>
↳(group1, group2)    [tag1]    {channel = "zwave:device:controller:node5:alarm_motion"}
Number    FrontDoor_Temperature       "FrontDoor Temperature [%d %]"      <battery>
↳
↳temperature"}

```

## 9.7 Example openHAB rules

### 9.7.1 Example 1

```

import HABApp
from HABApp.core.events import ValueChangeEvent, ValueUpdateEvent
from HABApp.openhab.events import ItemCommandEvent, ItemStateChangedEvent, ItemStateEvent
from HABApp.openhab.items import ContactItem, DateTimeItem, SwitchItem

class MyOpenhabRule(HABApp.Rule):

    def __init__(self):
        super().__init__()

        # get items
        test_contact = ContactItem.get_item('TestContact')
        test_date_time = DateTimeItem.get_item('TestDateTime')
        test_switch = SwitchItem.get_item('TestSwitch')

        # Trigger on item updates
        test_contact.listen_event(self.item_state_update, ItemStateEvent)
        test_date_time.listen_event(self.item_state_update, ValueUpdateEvent)

        # Trigger on item changes

```

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```

test_contact.listen_event(self.item_state_change, ItemStateChangedEvent)
test_date_time.listen_event(self.item_state_change, ValueChangeEvent)

# Trigger on item commands
test_switch.listen_event(self.item_command, ItemCommandEvent)

def item_state_update(self, event):
    assert isinstance(event, ValueUpdateEvent)
    print(f'{event}')

def item_state_change(self, event):
    assert isinstance(event, ValueChangeEvent)
    print(f'{event}')

# interaction is available through self.openhab or self.oh
self.openhab.send_command('TestItemCommand', 'ON')

# example for interaction with openhab item type
switch_item = SwitchItem.get_item('TestSwitch')
if switch_item.is_on():
    switch_item.off()

def item_command(self, event):
    assert isinstance(event, ItemCommandEvent)
    print(f'{event}')

# interaction is available through self.openhab or self.oh
self.oh.post_update('ReceivedCommand', str(event))

```

MyOpenhabRule()

## 9.7.2 Check status of things

This rule prints the status of all Things and shows how to subscribe to events of the Thing status

```

from HABApp import Rule
from HABApp.core.events import EventFilter
from HABApp.openhab.events import ThingStatusInfoChangedEvent
from HABApp.openhab.items import Thing

class CheckAllThings(Rule):
    def __init__(self):
        super().__init__()

        for thing in self.get_items(Thing):
            thing.listen_event(self.thing_status_changed,
                               EventFilter(ThingStatusInfoChangedEvent))
            print(f'{thing.name}: {thing.status}')

```

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```
def thing_status_changed(self, event: ThingStatusInfoChangedEvent):
    print(f'{event.name} changed from {event.old_status} to {event.status}')
```

```
CheckAllThings()
```

### 9.7.3 Check status if thing is constant

Sometimes Things recover automatically from small outages. This rule only triggers when the Thing is constant for 60 seconds.

```
from HABApp import Rule
from HABApp.core.events import ItemNoChangeEvent
from HABApp.openhab.items import Thing

class CheckThing(Rule):
    def __init__(self, name: str):
        super().__init__()

        self.thing = Thing.get_item(name)
        watcher = self.thing.watch_change(60)
        watcher.listen_event(self.thing_no_change)

    def thing_no_change(self, event: ItemNoChangeEvent):
        print(f'Thing {event.name} constant for {event.seconds}')
        print(f'Status: {self.thing.status}')
```

```
CheckThing('my:thing:uid')
```

```
Thing test_watch constant for 60
Status: ONLINE
```



## 10.1 Interaction with the MQTT broker

Interaction with the MQTT broker is done through the `self.mqtt` object in the rule or through the `MqttItem`. When receiving a topic for the first time a new `MqttItem` will automatically be created.

## 10.2 Rule Interface

`class mqtt`

**publish**(*topic: str, payload: typing.Any*[, *qos: int = None, retain: bool = None*]) → `int`

Publish a value under a certain topic.

### Parameters

- **topic** – MQTT topic
- **payload** – MQTT Payload
- **qos** (`int`) – QoS, can be 0, 1 or 2. If not specified value from configuration file will be used.
- **retain** (`bool`) – retain message. If not specified value from configuration file will be used.

### Returns

0 if successful

**subscribe**(*self, topic: str*[, *qos: int = None*]) → `int`

Subscribe to a MQTT topic. Please note that subscriptions made this way are volatile, and will only remain until the next disconnect. For persistent subscriptions use the corresponding entry in the configuration file. By default HABApp listens to all topics so the topics can be used in `listen_event`.

### Parameters

- **topic** – MQTT topic to subscribe to
- **qos** – QoS, can be 0, 1 or 2. If not specified value from configuration file will be used.

### Returns

0 if successful

**unsubscribe**(self, topic: str) → int

Unsubscribe from a MQTT topic

**Parameters**

**topic** – MQTT topic

**Returns**

0 if successful

## 10.3 Mqtt item types

Mqtt items have an additional publish method which make interaction with the mqtt broker easier.

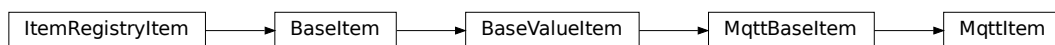
```
from HABApp.mqtt.items import MqttItem
from HABApp.core.events import ValueChangeEvent

# Messages with a retain flag will automatically create a corresponding item in HABApp.
# All other items have to be created manually
my_mqtt_item = MqttItem.get_create_item('test/topic')

# easy to publish values
my_mqtt_item.publish('new_value')

# comparing the item to get the state works, too
if my_mqtt_item == 'test':
    pass # do something
```

### 10.3.1 MqttItem



**class MqttItem()**

A simple item that represents a topic and a value

**classmethod get\_create\_item**(name, initial\_value=None)

Creates a new item in HABApp and returns it or returns the already existing one with the given name

**Parameters**

- **name** (str) – item name
- **initial\_value** – state the item will have if it gets created

**Return type**

*MqttItem*



**Returns**

item

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters****name** (`str`) – Name of the item**get\_value**(`default_value=None`)

Return the value of the item. This is a helper function that returns a default in case the item value is None.

**Parameters****default\_value** – Return this value if the item value is None**Return type**`Any`**Returns**

value of the item

**listen\_event**(`callback, event_filter=None`)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**`TypeVar(HINT_EVENT_BUS_LISTENER, bound=EventBusListener)`**post\_value**(`new_value`)Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns**

True if state has changed

**post\_value\_if**(`new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>, ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>, le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>, greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)`)

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post

- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**`bool`**Returns***True* if the new value was posted else *False***publish**(*payload*, *qos=None*, *retain=None*)

Publish the payload under the topic from the item.

**Parameters**

- **payload** – MQTT Payload
- **qos** (`Optional[int]`) – QoS, can be 0, 1 or 2. If not specified value from configuration file will be used.
- **retain** (`Optional[bool]`) – retain message. If not specified value from configuration file will be used.

**set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters****new\_value** – new value of the item**Return type**`bool`**Returns***True* if state has changed**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters****secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoChangeWatch***Returns**

The watch obj which can be used to cancel the watch

**watch\_update(secs)**

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type***ItemNoUpdateWatch***Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

**property name: str****Returns**

Name of the item (read only)

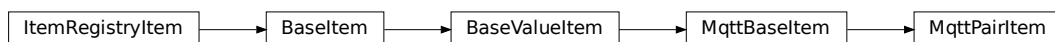
### 10.3.2 MqttPairItem

An item that consolidates a topic that reports states from a device and a topic that is used to write to a device. It is created on the topic that reports the state from the device.

```
from HABApp.mqtt.items import MqttPairItem

# MqttPairItem works out of the box with zigbee2mqtt
mqtt = MqttPairItem.get_create_item("zigbee2mqtt/my_bulb/brightness")
mqtt.publish("255") # <-- will use the write topic

# equivalent to
mqtt = MqttPairItem.get_create_item("zigbee2mqtt/my_bulb/brightness", write_topic=
  ↳ "zigbee2mqtt/my_bulb/set/brightness")
```



**class** `MqttPairItem()`

An item that represents both a topic that is used to read and a corresponding topic that is used to write values

**classmethod** `get_create_item(name, write_topic=None, initial_value=None)`

Creates a new item in HABApp and returns it or returns the already existing one with the given name. HABApp tries to automatically derive the write topic from the item name. In cases where this does not work it can be specified manually.

**Parameters**

- **name** (`str`) – item name (topic that reports the state)
- **write\_topic** (`Optional[str]`) – topic that is used to write values or `None` (default) to build it automatically
- **initial\_value** – state the item will have if it gets created

**Return type**

`MqttPairItem`

**Returns**

item

**classmethod** `get_item(name)`

Returns an already existing item. If it does not exist or has a different item type an exception will occur.

**Parameters**

**name** (`str`) – Name of the item

**get\_value** (`default_value=None`)

Return the value of the item. This is a helper function that returns a default in case the item value is `None`.

**Parameters**

**default\_value** – Return this value if the item value is `None`

**Return type**

`Any`

**Returns**

value of the item

**listen\_event** (`callback, event_filter=None`)

Register an event listener which listens to all event that the item receives

**Parameters**

- **callback** (`Callable[[Any], Any]`) – callback that accepts one parameter which will contain the event
- **event\_filter** (`Optional[TypeVar(HINT_EVENT_FILTER_OBJ, bound=EventFilterBase)]`) – Event filter. This is typically `ValueUpdateEventFilter` or `ValueChangeEventFilter` which will also trigger on changes/update from openhab or mqtt. Additionally it can be an instance of `EventFilter` which additionally filters on the values of the event. It is also possible to group filters logically with, e.g. `AndFilterGroup` and `OrFilterGroup`

**Return type**

`TypeVar(HINT_EVENT_BUS_LISTENER, bound= EventBusListener)`

**post\_value** (`new_value`)

Set a new value and post appropriate events on the HABApp event bus (`ValueUpdateEvent`, `ValueChangeEvent`)

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

```
post_value_if(new_value, *, equal=<MISSING>, eq=<MISSING>, not_equal=<MISSING>,
               ne=<MISSING>, lower_than=<MISSING>, lt=<MISSING>, lower_equal=<MISSING>,
               le=<MISSING>, greater_than=<MISSING>, gt=<MISSING>,
               greater_equal=<MISSING>, ge=<MISSING>, is_=<MISSING>, is_not=<MISSING>)
```

Post a value depending on the current state of the item. If one of the comparisons is true the new state will be posted.

**Parameters**

- **new\_value** – new value to post
- **equal** – item state has to be equal to the passed value
- **eq** – item state has to be equal to the passed value
- **not\_equal** – item state has to be not equal to the passed value
- **ne** – item state has to be not equal to the passed value
- **lower\_than** – item state has to be lower than the passed value
- **lt** – item state has to be lower than the passed value
- **lower\_equal** – item state has to be lower equal the passed value
- **le** – item state has to be lower equal the passed value
- **greater\_than** – item state has to be greater than the passed value
- **gt** – item state has to be greater than the passed value
- **greater\_equal** – item state has to be greater equal the passed value
- **ge** – item state has to be greater equal the passed value
- **is** – item state has to be the same object as the passt value (e.g. None)
- **is\_not** – item state has to be not the same object as the passt value (e.g. None)

**Return type**

`bool`

**Returns**

True if the new value was posted else False

```
publish(payload, qos=None, retain=None)
```

Publish the payload under the write topic from the item.

**Parameters**

- **payload** – MQTT Payload
- **qos** (`Optional[int]`) – QoS, can be 0, 1 or 2. If not specified value from configuration file will be used.
- **retain** (`Optional[bool]`) – retain message. If not specified value from configuration file will be used.

**Returns**

0 if successful

**set\_value**(*new\_value*)

Set a new value without creating events on the event bus

**Parameters**

**new\_value** – new value of the item

**Return type**

`bool`

**Returns**

True if state has changed

**watch\_change**(*secs*)

Generate an event if the item does not change for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoChangeWatch`

**Returns**

The watch obj which can be used to cancel the watch

**watch\_update**(*secs*)

Generate an event if the item does not receive and update for a certain period of time. Has to be called from inside a rule function.

**Parameters**

**secs** (`Union[int, float, timedelta]`) – secs after which the event will occur, max 1 decimal digit for floats

**Return type**

`ItemNoUpdateWatch`

**Returns**

The watch obj which can be used to cancel the watch

**property last\_change: DateTime****Returns**

Timestamp of the last time when the item has been changed (read only)

**property last\_update: DateTime****Returns**

Timestamp of the last time when the item has been updated (read only)

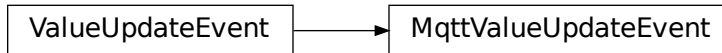
**property name: str****Returns**

Name of the item (read only)

## 10.4 Mqtt event types

### 10.4.1 MqttValueUpdateEvent

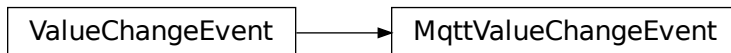
Since this event inherits from *ValueUpdateEvent* you can listen to *ValueUpdateEvent* and it will also trigger for *MqttValueUpdateEvent*.



```
class MqttValueUpdateEvent(name, value)
```

### 10.4.2 MqttValueChangeEvent

Since this event inherits from *ValueChangeEvent* you can listen to *ValueChangeEvent* and it will also trigger for *MqttValueChangeEvent*.



```
class MqttValueChangeEvent(name, value, old_value)
```

## 10.5 Example MQTT rule

```
import datetime
import random

import HABApp
from HABApp.core.events import ValueUpdateEvent, ValueUpdateEventFilter
from HABApp.mqtt.items import MqttItem

class ExampleMqttTestRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

        self.run.every(
            start_time=datetime.timedelta(seconds=10),
```

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```
        interval=datetime.timedelta(seconds=20),
        callback=self.publish_rand_value
    )

    self.my_mqtt_item = MqttItem.get_create_item('test/test')

    self.listen_event('test/test', self.topic_updated, ValueUpdateEventFilter())

    def publish_rand_value(self):
        print('test mqtt_publish')
        self.my_mqtt_item.publish(str(random.randint(0, 1000)))

    def topic_updated(self, event):
        assert isinstance(event, ValueUpdateEvent), type(event)
        print( f'mqtt topic "test/test" updated to {event.value}')
```

```
ExampleMqttTestRule()
```



## ADVANCED USAGE

### 11.1 HABApp Topics

There are several internal topics which can be used to react to HABApp changes from within rules. An example would be dynamically reloading files or an own notifier in case there are errors (e.g. Pushover).

Topic	Description	Events
HABApp.F	The corresponding events trigger a load/unload of the file specified in the event	<a href="#"><i>RequestFileLoadEvent</i></a> and <a href="#"><i>RequestFileUnloadEvent</i></a>
HABApp.I	All infos in functions and rules of HABApp create an according event	<a href="#"><i>str</i></a>
HABApp.W	All warnings in functions (e.g. caught exceptions) and rules of HABApp create an according event	<a href="#"><i>HABAppException</i></a> or <a href="#"><i>str</i></a>
HABApp.E	All errors in functions and rules of HABApp create an according event. Use this topic to create an own notifier in case of errors (e.g. Pushover).	<a href="#"><i>HABAppException</i></a> or <a href="#"><i>str</i></a>

**class RequestFileLoadEvent**(*name*)

Request (re-) loading of the specified file

**Variables**

**filename** (*str*) – relative filename

**class RequestFileUnloadEvent**(*name*)

Request unloading of the specified file

**Variables**

**filename** (*str*) – relative filename

**class HABAppException**(*func\_name*, *exception*, *traceback*)

Contains information about an Exception that has occurred in HABApp

**Variables**

- **func\_name** (*str*) – name of the function where the error occurred
- **traceback** (*str*) – traceback
- **exception** (*Exception*) – Exception

**to\_str**()

Create a readable str with all information

**Return type**

*str*

## 11.2 File properties

For every HABApp file it is possible to specify some properties. The properties are specified as a comment (prefixed with #) somewhere at the beginning of the file and are in the yml format. The keyword HABApp can be arbitrarily intended.

---

**Hint:** File names are not absolute but relative with a folder specific prefix. It's best to use the file name from the `RequestFileLoadEvent` from the HABApp event bus.

---

Configuration format

```
HABApp:
  depends on:
    - filename
  reloads on:
    - filename
```

Property	Description
depends on	The file will only get loaded when <b>all</b> of the files specified as dependencies have been successfully loaded
reloads on	The file will get automatically reloaded when <b>one of</b> the files specified will be reloaded

Example

```
# Some other stuff
#
# HABApp:
#   depends on:
#     - rules/rule_file.py
#   reloads on:
#     - params/param_file.yml
import HABApp
...
```

## 11.3 Running Python code on startup

It's possible to run arbitrary code during the startup of HABApp. This can be achieved by creating a module/package called HABAppUser. HABApp will try to import it before loading the configuration and thus execute the code. The module/package must be importable so it has to be in one of the PATH/PYTHONPATH folders or in the current working directory.

## 11.4 Invoking openHAB actions

The openHAB REST interface does not expose [actions](#), and thus there is no way to trigger them from HABApp. Even if it is not possible to create an openHAB item that directly triggers the action, there is a way to work around it with additional items within openHAB. An additional openHAB (note not HABApp) rule listens to changes on those items and invokes the appropriate openHAB actions. On the HABApp side these actions are indirectly executed by setting the values for those items.

Below is an example how to invoke the openHAB Audio and Voice actions.

First, define a couple of items to accept values from HABApp, and place them in `/etc/openhab2/items/habapp-bridge.items`:

```
String AudioVoiceSinkName

String TextToSpeechMessage
String AudioFileLocation
String AudioStreamUrl
```

Second, create the JSR223 script to invoke the actions upon changes in the values of the items above.

```
from core import osgi
from core.jsr223 import scope
from core.rules import rule
from core.triggers import when
from org.eclipse.smarthome.model.script.actions import Audio
from org.eclipse.smarthome.model.script.actions import Voice

SINK_ITEM_NAME = 'AudioVoiceSinkName'

@rule("Play voice TTS message")
@when("Item TextToSpeechMessage changed")
def onTextToSpeechMessageChanged(event):
    ttl = scope.items[event.itemName].toString()
    if ttl is not None and ttl != '':
        Voice.say(ttl, None, scope.items[SINK_ITEM_NAME].toString())

    # reset the item to wait for the next message.
    scope.events.sendCommand(event.itemName, '')

@rule("Play audio stream URL")
@when("Item AudioStreamUrl changed")
def onAudioStreamURLChanged(event):
    stream_url = scope.items[event.itemName].toString()
    if stream_url is not None and stream_url != '':
        Audio.playStream(scope.items[SINK_ITEM_NAME].toString(), stream_url)

    # reset the item to wait for the next message.
    scope.events.sendCommand(event.itemName, '')

@rule("Play local audio file")
@when("Item AudioFileLocation changed")
def onAudioFileLocationChanged(event):
    file_location = scope.items[event.itemName].toString()
```

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```

if file_location is not None and file_location != '':
    Audio.playSound(scope.items[SINK_ITEM_NAME].toString(), file_location)

    # reset the item to wait for the next message.
    scope.events.sendCommand(event.itemName, '')

```

Finally, define the HABApp functions to indirectly invoke the actions:

```

def play_local_audio_file(sink_name: str, file_location: str):
    """ Plays a local audio file on the given audio sink. """
    HABApp.openhab.interface_sync.send_command(ACTION_AUDIO_SINK_ITEM_NAME, sink_name)
    HABApp.openhab.interface_sync.send_command(ACTION_AUDIO_LOCAL_FILE_LOCATION_ITEM_
↳NAME, file_location)

def play_stream_url(sink_name: str, url: str):
    """ Plays a stream URL on the given audio sink. """
    HABApp.openhab.interface_sync.send_command(ACTION_AUDIO_SINK_ITEM_NAME, sink_name)
    HABApp.openhab.interface_sync.send_command(ACTION_AUDIO_STREAM_URL_ITEM_NAME, url)

def play_text_to_speech_message(sink_name: str, tts: str):
    """ Plays a text to speech message on the given audio sink. """
    HABApp.openhab.interface_sync.send_command(ACTION_AUDIO_SINK_ITEM_NAME, sink_name)
    HABApp.openhab.interface_sync.send_command(ACTION_TEXT_TO_SPEECH_MESSAGE_ITEM_NAME,
↳tts)

```

## 11.5 Mocking openHAB items and events for tests

It is possible to create mock items in HABApp which do not exist in openHAB to create unit tests for rules and libraries. Ensure that this mechanism is only used for testing because since the items will not exist in openHAB they will not get updated which can lead to hard to track down errors.

Examples:

Add an openHAB mock item to the item registry

```

import HABApp
from HABApp.openhab.items import SwitchItem

item = SwitchItem('my_switch', 'ON')
HABApp.core.Items.add_item(item)

```

Remove the mock item from the registry:

```

HABApp.core.Items.pop_item('my_switch')

```

Note that there are some item methods that encapsulate communication with openhab (e.g.: `SwitchItem.on()`, `SwitchItem.off()`, and `DimmerItem.percentage()`) These currently do not work with the mock items. The state has to be changed like any internal item.

```
import HABApp
from HABApp.openhab.items import SwitchItem
from HABApp.openhab.definitions import OnOffValue

item = SwitchItem('my_switch', 'ON')
HABApp.core.Items.add_item(item)

item.set_value(OnOffValue.ON)    # without bus event
item.post_value(OnOffValue.OFF) # with bus event
```



**Warning:**

Please make sure you know what you are doing when using async functions!

If you have no asyncio experience please do not use this! The use of blocking calls in async functions will prevent HABApp from working properly!

## 12.1 async http

Async http calls are available through the `self.async_http` object in rule instances.

### 12.1.1 Functions

**delete**(*url*, *params=None*, *\*\*kwargs*)

http delete request

**Parameters**

- **url** (*str*) – Request URL
- **params** (*Optional[Mapping[str, str]]*) – Mapping, iterable of tuple of key/value pairs (e.g. dict) to be sent as parameters in the query string of the new request. [Params example](#)
- **kwargs** (*Any*) – See [aiohttp request](#) for further possible kwargs

**Return type**

`_RequestContextManager`

**Returns**

awaitable

**get**(*url*, *params=None*, *\*\*kwargs*)

http get request

**Parameters**

- **url** (*str*) – Request URL
- **params** (*Optional[Mapping[str, str]]*) – Mapping, iterable of tuple of key/value pairs (e.g. dict) to be sent as parameters in the query string of the new request. [Params example](#)
- **kwargs** (*Any*) – See [aiohttp request](#) for further possible kwargs

**Return type**`_RequestContextManager`**Returns**

awaitable

**get\_client\_session()**Return the aiohttp [client session object](#) for use in aiohttp libraries**Return type**`ClientSession`**Returns**

session object

**post(url, params=None, data=None, json=None, \*\*kwargs)**

http post request

**Parameters**

- **url** ([str](#)) – Request URL
- **params** ([Optional](#)[[Mapping](#)[[str](#), [str](#)]]) – Mapping, iterable of tuple of key/value pairs (e.g. dict) to be sent as parameters in the query string of the new request. [Params example](#)
- **data** ([Optional](#)[[Any](#)]) – Dictionary, bytes, or file-like object to send in the body of the request (optional)
- **json** ([Optional](#)[[Any](#)]) – Any json compatible python object, json and data parameters could not be used at the same time. (optional)
- **kwargs** ([Any](#)) – See [aiohttp request](#) for further possible kwargs

**Return type**`_RequestContextManager`**Returns**

awaitable

**put(url, params=None, data=None, json=None, \*\*kwargs)**

http put request

**Parameters**

- **url** ([str](#)) – Request URL
- **params** ([Optional](#)[[Mapping](#)[[str](#), [str](#)]]) – Mapping, iterable of tuple of key/value pairs (e.g. dict) to be sent as parameters in the query string of the new request. [Params example](#)
- **data** ([Optional](#)[[Any](#)]) – Dictionary, bytes, or file-like object to send in the body of the request (optional)
- **json** ([Optional](#)[[Any](#)]) – Any json compatible python object, json and data parameters could not be used at the same time. (optional)
- **kwargs** ([Any](#)) – See [aiohttp request](#) for further possible kwargs

**Return type**`_RequestContextManager`**Returns**

awaitable



### 12.1.2 Examples

```
import asyncio

import HABApp

class AsyncRule(HABApp.Rule):

    def __init__(self):
        super().__init__()

        self.run.soon(self.async_func)

    async def async_func(self):
        await asyncio.sleep(2)
        async with self.async_http.get('http://httpbin.org/get') as resp:
            print(resp)
            print(await resp.text())

AsyncRule()
```



## UTIL - HELPERS AND UTILITIES

The util package contains useful classes which make rule creation easier.

### 13.1 Functions

#### 13.1.1 min

This function is very useful together with the all possible functions of *ValueMode* for the *MultiModeItem*. For example it can be used to automatically disable or calculate the new value of the *ValueMode*. It behaves like the standard python function except that it will ignore *None* values which are sometimes set as the item state.

```
from HABApp.util.functions import min

print(min(1, 2, None))
```

**min**(\*args, default=None)

Behaves like the built-in min function but ignores any *None* values. e.g. `min([1, None, 2]) == 1`. If the iterable is empty `default` will be returned.

**Parameters**

- **args** – Single iterable or 1..n arguments
- **default** – Value that will be returned if the iterable is empty

**Returns**

min value

#### 13.1.2 max

This function is very useful together with the all possible functions of *ValueMode* for the *MultiModeItem*. For example it can be used to automatically disable or calculate the new value of the *ValueMode*. It behaves like the standard python function except that it will ignore *None* values which are sometimes set as the item state.

```
from HABApp.util.functions import max

print(max(1, 2, None))
```

**max**(\*args, default=None)

Behaves like the built-in max function but ignores any *None* values. e.g. `max([1, None, 2]) == 2`. If the iterable is empty `default` will be returned.

**Parameters**

- **args** – Single iterable or 1..n arguments
- **default** – Value that will be returned if the iterable is empty

**Returns**

max value

### 13.1.3 rgb\_to\_hsb

Converts a rgb value to hsb color space

```
from HABApp.util.functions import rgb_to_hsb
print(rgb_to_hsb(224, 201, 219))
```

**rgb\_to\_hsb**(*r*, *g*, *b*, *max\_rgb\_value*=255, *ndigits*=2)

Convert from rgb to hsb/hsv

**Parameters**

- **r** (`Union[int, float]`) – red value
- **g** (`Union[int, float]`) – green value
- **b** (`Union[int, float]`) – blue value
- **max\_rgb\_value** (`int`) – maximal possible rgb value (e.g. 255 for 8 bit or 65.535 for 16bit values)
- **ndigits** (`Optional[int]`) – Round the hsb values to the specified digits, None to disable rounding

**Return type**

`Tuple[float, float, float]`

**Returns**

Values for hue, saturation and brightness / value

### 13.1.4 hsb\_to\_rgb

Converts a hsb value to the rgb color space

```
from HABApp.util.functions import hsb_to_rgb
print(hsb_to_rgb(150, 40, 100))
```

**hsb\_to\_rgb**(*h*, *s*, *b*, *max\_rgb\_value*=255)

Convert from rgb to hsv/hsb

**Parameters**

- **h** – hue
- **s** – saturation
- **b** – brightness / value

- **max\_rgb\_value** – maximal value for the returned rgb values (e.g. 255 for 8 bit or 65.535 16bit values)

**Return type**`Tuple[int, int, int]`**Returns**

Values for red, green and blue

## 13.2 Rate limiter

A simple rate limiter implementation which can be used in rules. The limiter is not rule bound so the same limiter can be used in multiples files. It also works as expected across rule reloads.

### 13.2.1 Defining limits

Limits can either be explicitly added or through a textual description. If the limit does already exist it will not be added again. It's possible to explicitly create the limits or through some small textual description with the following syntax:

```
[count] [per|in|/] [count (optional)] [s|sec|second|m|min|minute|hour|h|day|month|year].  
↪[s (optional)]
```

Whitespaces are ignored and can be added as desired

Examples:

- 5 per minute
- 20 in 15 mins
- 300 / hour

### 13.2.2 Fixed window elastic expiry algorithm

This algorithm implements a fixed window with elastic expiry. That means if the limit is hit the interval time will be increased by the expiry time.

For example 3 per minute:

- First hit comes 00:00:00. Two more hits at 00:00:59. All three pass, intervall goes from 00:00:00 - 00:01:00. Another hit comes at 00:01:01 and passes. The intervall now goes from 00:01:01 - 00:02:01.
- First hit comes 00:00:00. Two more hits at 00:00:30. All three pass. Another hit comes at 00:00:45, which gets rejected and the intervall now goes from 00:00:00 - 00:01:45. A rejected hit makes the interval time longer by expiry time. If another hit comes at 00:01:30 it will also get rejected and the intervall now goes from 00:00:00 - 00:02:30.

### 13.2.3 Leaky bucket algorithm

The leaky bucket algorithm is based on the analogy of a bucket that leaks at a constant rate. As long as the bucket is not full the hits will pass. If the bucket overflows the hits will get rejected. Since the bucket leaks at a constant rate it will gradually get empty again thus allowing hits to pass again.

### 13.2.4 Example

```
from HABApp.util import RateLimiter

# Create or get existing, name is case insensitive
limiter = RateLimiter('MyRateLimiterName')

# define limits, duplicate limits of the same algorithm will only be added once
# These lines all define the same limit so it'll result in only one limiter added
limiter.add_limit(5, 60) # add limits explicitly
limiter.parse_limits('5 per minute').parse_limits('5 in 60s', '5/60seconds') # add
↳ limits through text

# add additional limit with leaky bucket algorithm
limiter.add_limit(10, 100, algorithm='leaky_bucket')

# add additional limit with fixed window elastic expiry algorithm
limiter.add_limit(10, 100, algorithm='fixed_window_elastic_expiry')

# Test the limit without increasing the hits
for _ in range(100):
    assert limiter.test_allow()

# the limiter will allow 5 calls ...
for _ in range(5):
    assert limiter.allow()

# and reject the 6th
assert not limiter.allow()

# It's possible to get statistics about the limiter and the corresponding windows
print(limiter.info())

# There is a counter that keeps track of the total skips that can be reset
print('Counter:')
print(limiter.total_skips)
limiter.reset() # Can be reset
print(limiter.total_skips)
```

```
LimiterInfo(skips=1, total_skips=1, limits=[LeakyBucketLimitInfo(hits=5, skips=1,
↳ limit=5, time_remaining=11.999665174000256), LeakyBucketLimitInfo(hits=5, skips=0,
↳ limit=5, time_remaining=9.99970667299931), FixedWindowElasticExpiryLimitInfo(hits=5,
↳ skips=0, limit=10, time_remaining=99.99997427600101)])
Counter:
1
0
```

### 13.2.5 Recommendation

Limiting external requests to an external API works well with the leaky bucket algorithm (maybe with some initial hits). For limiting notifications the best results can be achieved by combining both algorithms. Fixed window elastic expiry will notify but block until an issue is resolved, that's why it's more suited for small intervals. Leaky bucket will allow hits even while the issue persists, that's why it's more suited for larger intervals.

```
from HABApp.util import RateLimiter

limiter = RateLimiter('MyNotifications')
limiter.parse_limits('5 in 1 minute', algorithm='fixed_window_elastic_expiry')
limiter.parse_limits("20 in 1 hour", algorithm='leaky_bucket')
```

### 13.2.6 Documentation

#### **RateLimiter**(*name*)

Create a new rate limiter or return an already existing one with a given name.

##### **Parameters**

**name** (*str*) – case insensitive name of limiter

##### **Return type**

*Limiter*

##### **Returns**

Rate limiter object

#### **class Limiter**(*name*)

##### **property total\_skips:** *int*

A counter to track skips which can be manually reset

##### **add\_limit**(*allowed, interval, \*, initial\_hits=0, algorithm='leaky\_bucket'*)

Add a new rate limit

##### **Parameters**

- **allowed** (*int*) – How many hits are allowed
- **interval** (*int*) – Interval in seconds
- **initial\_hits** (*int*) – How many hits the limit already has when it gets initially created
- **algorithm** (*Literal*['leaky\_bucket', 'fixed\_window\_elastic\_expiry']) – Which algorithm should this limit use

##### **Return type**

*Limiter*

##### **parse\_limits**(*\*text, initial\_hits=0, algorithm='leaky\_bucket'*)

Add one or more limits in textual form, e.g. 5 in 60s, 10 per hour or 10/15 mins. If the limit does already exist it will not be added again.

##### **Parameters**

- **text** (*str*) – textual description of limit
- **initial\_hits** (*int*) – How many hits the limit already has when it gets initially created

- **algorithm** (`Literal['leaky_bucket', 'fixed_window_elastic_expiry']`) – Which algorithm should these limits use

**Return type**

`Limiter`

**allow()**

Test the limit(s).

**Return type**

`bool`

**Returns**

True if allowed, False if forbidden

**test\_allow()**

Test the limit(s) without hitting it. Calling this will not increase the hit counter.

**Return type**

`bool`

**Returns**

True if allowed, False if forbidden

**info()**

Get some info about the limiter and the defined windows

**Return type**

`LimiterInfo`

**reset()**

Reset the skip counter

**Return type**

`Limiter`

**class LimiterInfo**(`skips, total_skips, limits`)

**skips:** `int`

How many entries were skipped in the active interval(s)

**total\_skips:** `int`

How many entries were skipped in total

**limits:** `List[Union[FixedWindowElasticExpiryLimitInfo, LeakyBucketLimitInfo]]`

Info for every limit

**class FixedWindowElasticExpiryLimitInfo**(`hits, skips, limit, time_remaining`)

**time\_remaining:** `float`

Time remaining until this window will reset

**hits:** `int`

Hits

**skips:** `int`

Skips

**limit:** `int`

Boundary



```
class LeakyBucketLimitInfo(hits, skips, limit, time_remaining)
```

```
    time_remaining: float
```

Time remaining until the next drop

```
    hits: int
```

Hits

```
    skips: int
```

Skips

```
    limit: int
```

Boundary

## 13.3 Statistics

### 13.3.1 Example

```
s = Statistics(max_samples=4)
for i in range(1,4):
    s.add_value(i)
print(s)
```

```
<Statistics sum: 1.0, min: 1.00, max: 1.00, mean: 1.00, median: 1.00>
<Statistics sum: 3.0, min: 1.00, max: 2.00, mean: 1.50, median: 1.50>
<Statistics sum: 6.0, min: 1.00, max: 3.00, mean: 2.00, median: 2.00>
```

### 13.3.2 Documentation

```
class Statistics(max_age=None, max_samples=None)
```

Calculate mathematical statistics of numerical values.

#### Variables

- **sum** – sum of all values
- **min** – minimum of all values
- **max** – maximum of all values
- **mean** – mean of all values
- **median** – median of all values
- **last\_value** – last added value
- **last\_change** – timestamp the last time a value was added

```
update()
```

update values without adding a new value

```
add_value(value)
```

Add a new value and recalculate statistical values

#### Parameters

**value** – new value

## 13.4 Fade

Fade is a helper class which allows to easily fade a value up or down.

### 13.4.1 Example

This example shows how to fade a Dimmer from 0 to 100 in 30 secs

```
from HABApp import Rule
from HABApp.openhab.items import DimmerItem
from HABApp.util import Fade

class FadeExample(Rule):
    def __init__(self):
        super().__init__()
        self.dimmer = DimmerItem.get_item('Dimmer1')
        self.fade = Fade(callback=self.fade_value) # self.dimmer.percent would also be a good callback in this example

        # Setup the fade and schedule its execution
        # Fade from 0 to 100 in 30s
        self.fade.setup(0, 100, 30).schedule_fade()

    def fade_value(self, value):
        self.dimmer.percent(value)

FadeExample()
```

This example shows how to fade three values together (e.g. for an RGB strip)

```
from HABApp import Rule
from HABApp.openhab.items import DimmerItem
from HABApp.util import Fade

class Fade3Example(Rule):
    def __init__(self):
        super().__init__()
        self.fade1 = Fade(callback=self.fade_value)
        self.fade2 = Fade()
        self.fade3 = Fade()

        # Setup the fades and schedule the execution of one fade where the value gets updated every sec
        self.fade3.setup(0, 100, 30)
        self.fade2.setup(0, 50, 30)
        self.fade1.setup(0, 25, 30, min_step_duration=1).schedule_fade()

    def fade_value(self, value):
        value1 = value
        value2 = self.fade2.get_value()
        value3 = self.fade3.get_value()
```

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```
Fade3Example()
```

## 13.4.2 Documentation

**class Fade**(*callback=None, min\_value=0, max\_value=100*)

Helper to easily fade values up/down

### Variables

- **min\_value** – minimum valid value for the fade value
- **max\_value** – maximum valid value for the fade value
- **callback** – Function with one argument that will be automatically called with the new values when the scheduled fade runs

**setup**(*start\_value, stop\_value, duration, min\_step\_duration=0.2, now=None*)

Calculates everything that is needed to fade a value

### Parameters

- **start\_value** (*Union[int, float]*) – Start value
- **stop\_value** (*Union[int, float]*) – Stop value
- **duration** (*Union[int, float, timedelta]*) – How long shall the fade take
- **min\_step\_duration** (*float*) – minimum step duration (min 0.2 secs)
- **now** (*Optional[float]*) – time.time() timestamp to sync multiple fades together

### Return type

*Fade*

**get\_value**(*now=None*)

Returns the current value. If the fade is finished it will always return the stop value.

### Parameters

**now** (*Optional[float]*) – time.time() timestamp for which the value shall be returned. Can be used to sync multiple fades together. Not required.

### Return type

*float*

### Returns

current value

**property is\_finished:** *bool*

True if the fade is finished

**schedule\_fade**()

Automatically run the fade with the Scheduler. The callback can be used to set the current fade value e.g. on an item. Calling this on a running fade will restart the fade

### Return type

*Fade*

**stop\_fade**()

Stop the scheduled fade. This can be called multiple times without error

## 13.5 EventListenerGroup

EventListenerGroup is a helper class which allows to subscribe to multiple items at once. All subscriptions can be canceled together, too. This is useful if e.g. something has to be done once after a sensor reports a value.

### 13.5.1 Example

This is a rule which will turn on the lights once (!) in a room on the first movement in the morning. The lights will only turn on after 4 and before 8 and two movement sensors are used to pick up movement.

```
from datetime import time

from HABApp import Rule
from HABApp.core.events import ValueChangeEventFilter
from HABApp.openhab.items import SwitchItem, NumberItem
from HABApp.util import EventListenerGroup

class EventListenerGroupExample(Rule):
    def __init__(self):
        super().__init__()
        self.lights = SwitchItem.get_item('RoomLights')
        self.sensor_move_1 = NumberItem.get_item('MovementSensor1')
        self.sensor_move_2 = NumberItem.get_item('MovementSensor2')

        # use a list of items which will be subscribed with the same callback and event
        self.listeners = EventListenerGroup().add_listener(
            [self.sensor_move_1, self.sensor_move_2], self.sensor_changed,
            ValueChangeEventFilter())

        self.run.on_every_day(time(4), self.listen_sensors)
        self.run.on_every_day(time(8), self.sensors_cancel)

    def listen_sensors(self):
        self.listeners.listen()

    def sensors_cancel(self):
        self.listeners.cancel()

    def sensor_changed(self, event):
        self.listeners.cancel()
        self.lights.on()

EventListenerGroupExample()
```

### 13.5.2 Documentation

#### class `EventListenerGroup`

Helper to create/cancel multiple event listeners simultaneously

property **active**: `bool`

##### Returns

True if the listeners are currently active

##### `listen()`

Create all event listeners. If the event listeners are already active this will do nothing.

##### `cancel()`

Cancel the active event listeners. If the event listeners are not active this will do nothing.

##### `activate_listener(name)`

Resume a previously deactivated listener creator in the group.

##### Parameters

**name** (`str`) – item name or alias of the listener

##### Returns

True if it was activated, False if it was already active

##### `deactivate_listener(name, cancel_if_active=True)`

Exempt the listener creator from further listener/cancel calls

##### Parameters

- **name** (`str`) – item name or alias of the listener
- **cancel\_if\_active** – Cancel the listener if it is active

##### Returns

True if it was deactivated, False if it was already deactivated

##### `add_listener(item, callback, event_filter, alias=None)`

Add an event listener to the group

##### Parameters

- **item** (`Union[TypeVar(HINT_ITEM_OBJ, bound= BaseItem), Iterable[TypeVar(HINT_ITEM_OBJ, bound= BaseItem)]]`) – Single or multiple items
- **callback** (`Callable[[Any], Any]`) – Callback for the item(s)
- **event\_filter** (`TypeVar(HINT_EVENT_FILTER_OBJ, bound= EventFilterBase)`) – Event filter for the item(s)
- **alias** (`Optional[str]`) – Alias if an item with the same name does already exist (e.g. if different callbacks shall be created for the same item)

##### Return type

`EventListenerGroup`

##### Returns

self

**add\_no\_update\_watcher**(*item*, *callback*, *seconds*, *alias=None*)

**Add an no update watcher to the group. On listen this will create a no update watcher and the corresponding event listener that will trigger the callback**

**Parameters**

- **item** (`Union[TypeVar(HINT_ITEM_OBJ, bound= BaseItem), Iterable[TypeVar(HINT_ITEM_OBJ, bound= BaseItem)]]`) – Single or multiple items
- **callback** (`Callable[[Any], Any]`) – Callback for the item(s)
- **seconds** (`Union[int, float, timedelta]`) – No update time for the no update watcher
- **alias** (`Optional[str]`) – Alias if an item with the same name does already exist (e.g. if different callbacks shall be created for the same item)

**Return type**

*EventListenerGroup*

**Returns**

self

**add\_no\_change\_watcher**(*item*, *callback*, *seconds*, *alias=None*)

**Add a no change watcher to the group. On listen this will create a no change watcher and the corresponding event listener that will trigger the callback**

**Parameters**

- **item** (`Union[TypeVar(HINT_ITEM_OBJ, bound= BaseItem), Iterable[TypeVar(HINT_ITEM_OBJ, bound= BaseItem)]]`) – Single or multiple items
- **callback** (`Callable[[Any], Any]`) – Callback for the item(s)
- **seconds** (`Union[int, float, timedelta]`) – No update time for the no change watcher
- **alias** (`Optional[str]`) – Alias if an item with the same name does already exist (e.g. if different callbacks shall be created for the same item)

**Return type**

*EventListenerGroup*

**Returns**

self

## 13.6 MultiModelItem

Prioritizer item which automatically switches between values with different priorities. Very useful when different states or modes overlap, e.g. automatic and manual mode. etc.

### 13.6.1 Basic Example

```
import HABApp
from HABApp.core.events import ValueUpdateEventFilter
from HABApp.util.multimode import MultiModeItem, ValueMode

class MyMultiModeItemTestRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

        # create a new MultiModeItem
        item = MultiModeItem.get_create_item('MultiModeTestItem')
        item.listen_event(self.item_update, ValueUpdateEventFilter())

        # create two different modes which we will use and add them to the item
        auto = ValueMode('Automatic', initial_value=5)
        manu = ValueMode('Manual', initial_value=0)
        # Add the auto mode with priority 0 and the manual mode with priority 10
        item.add_mode(0, auto).add_mode(10, manu)

        # This shows how to enable/disable a mode and how to get a mode from the item
        print('disable/enable the higher priority mode')
        item.get_mode('manual').set_enabled(False) # disable mode
        item.get_mode('manual').set_value(11)      # setting a value will enable it
↪again

        # This shows that changes of the lower priority is only shown when
        # the mode with the higher priority gets disabled
        print('')
        print('Set value of lower priority')
        auto.set_value(55)
        print('Disable higher priority')
        manu.set_enabled(False)

    def item_update(self, event):
        print(f'State: {event.value}')

MyMultiModeItemTestRule()
```

```
disable/enable the higher priority mode
State: 5
State: 11
```

```
Set value of lower priority
State: 11
Disable higher priority
State: 55
```

### 13.6.2 Advanced Example

```
import logging
import HABApp
from HABApp.core.events import ValueUpdateEventFilter
from HABApp.util.multimode import MultiModeItem, ValueMode

class MyMultiModeItemTestRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

        # create a new MultiModeItem
        item = MultiModeItem.get_create_item('MultiModeTestItem')
        item.listen_event(self.item_update, ValueUpdateEventFilter())

        # helper to print the heading so we have a nice output
        def print_heading(_heading):
            print('')
            print('-' * 80)
            print(_heading)
            print('-' * 80)
            for p, m in item.all_modes():
                print(f'Prio {p:2d}: {m}')
            print('')

        log = logging.getLogger('AdvancedMultiMode')

        # create modes and add them
        auto = ValueMode('Automatic', initial_value=5, logger=log)
        manu = ValueMode('Manual', initial_value=10, logger=log)
        item.add_mode(0, auto).add_mode(10, manu)

        # it is possible to automatically disable a mode
        # this will disable the manual mode if the automatic mode
        # sets a value greater equal manual mode
        print_heading('Automatically disable mode')

        # A custom function can also disable the mode:
        manu.auto_disable_func = lambda low, own: low >= own

        auto.set_value(11) # <-- manual now gets disabled because
        auto.set_value(4)  # the lower priority value is >= itself

        # It is possible to use functions to calculate the new value for a mode.
        # E.g. shutter control and the manual mode moves the shades. If it's dark the
        ↪ automatic
        # mode closes the shutter again. This could be achieved by automatically
        ↪ disabling the
        # manual mode or if the state should be remembered then the max function should
        ↪ be used
```

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```

# create a move and use the max function for output calculation
manu = ValueMode('Manual', initial_value=5, logger=log, calc_value_func=max)
item.add_mode(10, manu)    # overwrite the earlier added mode

print_heading('Use of functions')

auto.set_value(7)    # manu uses max, so the value from auto is used
auto.set_value(3)

def item_update(self, event):
    print(f'Item value: {event.value}')

MyMultiModeItemTestRule()

```

-----  
Automatically disable mode  
-----

```

Prio 0: <ValueMode Automatic enabled: True, value: 5>
Prio 10: <ValueMode Manual enabled: True, value: 10>

```

```

[AdvancedMultiMode]      INFO | [x] Automatic: 11
[AdvancedMultiMode]      INFO | [ ] Manual (function)
Item value: 11
[AdvancedMultiMode]      INFO | [x] Automatic: 4
Item value: 4

```

-----  
Use of functions  
-----

```

Prio 0: <ValueMode Automatic enabled: True, value: 4>
Prio 10: <ValueMode Manual enabled: True, value: 5>

```

```

[AdvancedMultiMode]      INFO | [x] Automatic: 7
Item value: 7
[AdvancedMultiMode]      INFO | [x] Automatic: 3
Item value: 5

```

### 13.6.3 Example SwitchItemValueMode

The SwitchItemMode is same as ValueMode but enabled/disabled of the mode is controlled by a openHAB *SwitchItem*. This is very useful if the mode shall be deactivated from the openHAB sitemaps.

```

import HABApp
from HABApp.openhab.items import SwitchItem
from HABApp.util.multimode import MultiModeItem, SwitchItemValueMode, ValueMode

class MyMultiModeItemTestRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

```

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```

# create a new MultiModeItem
item = MultiModeItem.get_create_item('MultiModeTestItem')

# this switch allows to enable/disable the mode
switch = SwitchItem.get_item('Automatic_Enabled')
print(f'Switch is {switch}')

# this is how the switch gets linked to the mode
# if the switch is on, the mode is on, too
mode = SwitchItemValueMode('Automatic', switch)
print(mode)

# Use invert_switch if the desired behaviour is
# if the switch is off, the mode is on
mode = SwitchItemValueMode('AutomaticOff', switch, invert_switch=True)
print(mode)

# This shows how the SwitchItemValueMode can be used to disable any logic except
↳ for the manual mode.
# Now everything can be enabled/disabled from the openHAB sitemap
item.add_mode(100, mode)
item.add_mode(101, ValueMode('Manual'))

MyMultiModeItemTestRule()

```

```

Switch is ON
<SwitchItemValueMode Automatic enabled: True, value: None>
<SwitchItemValueMode AutomaticOff enabled: False, value: None>

```

## 13.6.4 Documentation

### MultiModeItem

**class** MultiModeItem()

Prioritizer *Item*

**classmethod** get\_create\_item(name, initial\_value=None, default\_value=<MISSING>)

Creates a new item in HABApp and returns it or returns the already existing one with the given name

#### Parameters

- **name** (*str*) – item name
- **initial\_value** – state the item will have if it gets created
- **default\_value** – Default value that will be sent if no mode is active

#### Return type

*MultiModeItem*

#### Returns

The created or existing item

**remove\_mode(*name*)**

Remove mode if it exists

**Parameters**

**name** (*str*) – name of the mode (case-insensitive)

**Return type**

*bool*

**Returns**

True if something was removed, False if nothing was found

**add\_mode(*priority, mode*)**

Add a new mode to the item, if it already exists it will be overwritten

**Parameters**

- **priority** (*int*) – priority of the mode
- **mode** (*TypeVar*(HINT\_BASE\_MODE, bound= BaseMode)) – instance of the MultiMode class

**Return type**

*MultiModeItem*

**all\_modes()**

Returns a sorted list containing tuples with the priority and the mode

**Return type**

*List*[*Tuple*[*int*, *TypeVar*(HINT\_BASE\_MODE, bound= BaseMode)]]

**Returns**

List with priorities and modes

**get\_mode(*name*)**

Returns a created mode

**Parameters**

**name** (*str*) – name of the mode (case insensitive)

**Return type**

*TypeVar*(HINT\_BASE\_MODE, bound= BaseMode)

**Returns**

The requested MultiModeValue

**calculate\_value()**

Recalculate the value. If the new value is not MISSING the calculated value will be set as the item state and the corresponding events will be generated.

**Return type**

*Any*

**Returns**

new value

## ValueMode

```
class ValueMode(name, initial_value=None, enabled=None, enable_on_value=True, logger=None,
                auto_disable_after=None, auto_disable_func=None, calc_value_func=None)
```

### Variables

- **last\_update** (*datetime*) – Timestamp of the last update/enable of this value
- **auto\_disable\_after** (*Optional[timedelta]*) – Automatically disable this mode after a given timedelta on the next recalculation
- **auto\_disable\_func** (*Optional[Callable[[Any, Any], bool]]*) – Function which can be used to disable this mode. Any function that accepts two Arguments can be used. First arg is value with lower priority, second argument is own value. Return True to disable this mode.
- **calc\_value\_func** (*Optional[Callable[[Any, Any], Any]]*) – Function to calculate the new value (e.g. min or max). Any function that accepts two Arguments can be used. First arg is value with lower priority, second argument is own value.

### property value

Returns the current value

### property enabled: bool

Returns if the value is enabled

### set\_value(value, only\_on\_change=False)

Set new value and recalculate overall value. If `enable_on_value` is set, setting a value will also enable the mode.

#### Parameters

- **value** – new value
- **only\_on\_change** (*bool*) – will set/enable the mode only if value differs or the mode is disabled

#### Returns

False if the value was not set, True otherwise

### set\_enabled(value, only\_on\_change=False)

Enable or disable this value and recalculate overall value

#### Parameters

- **value** (*bool*) – True/False
- **only\_on\_change** (*bool*) – enable only on change

#### Return type

*bool*

#### Returns

True if the value was set else False

### cancel()

Remove the mode from the parent `MultiModeItem` and stop processing it

## SwitchItemValueMode

```
class SwitchItemValueMode(name, switch_item, invert_switch=False, initial_value=None, logger=None,
                           auto_disable_after=None, auto_disable_func=None, calc_value_func=None)
```

SwitchItemMode, same as ValueMode but enabled/disabled of the mode is controlled by a OpenHAB [SwitchItem](#)

### Variables

- **last\_update** (*datetime*) – Timestamp of the last update/enable of this value
- **auto\_disable\_after** (*Optional[timedelta]*) – Automatically disable this mode after a given timedelta on the next recalculation
- **auto\_disable\_func** (*Optional[Callable[[Any, Any], bool]]*) – Function which can be used to disable this mode. Any function that accepts two Arguments can be used. First arg is value with lower priority, second argument is own value. Return True to disable this mode.
- **calc\_value\_func** (*Optional[Callable[[Any, Any], Any]]*) – Function to calculate the new value (e.g. min or max). Any function that accepts two Arguments can be used. First arg is value with lower priority, second argument is own value.

### cancel()

Remove the mode from the parent MultiModeItem and stop processing it

### property enabled: bool

Returns if the value is enabled

### set\_value(value, only\_on\_change=False)

Set new value and recalculate overall value. If enable\_on\_value is set, setting a value will also enable the mode.

### Parameters

- **value** – new value
- **only\_on\_change** (*bool*) – will set/enable the mode only if value differs or the mode is disabled

### Returns

False if the value was not set, True otherwise

### property value

Returns the current value



## ADDITIONAL RULE EXAMPLES

### 14.1 Using the scheduler

```
from datetime import datetime, time, timedelta

from HABApp import Rule

class MyRule(Rule):

    def __init__(self):
        super().__init__()

        self.run.on_day_of_week(time=time(14, 34, 20), weekdays=['Mo'], callback=self.
↳run_mondays)

        self.run.every(timedelta(seconds=5), 3, self.run_every_3s, 'arg 1', asdf='kwarg 1
↳')

        self.run.on_workdays(time(15, 00), self.run_workdays)
        self.run.on_weekends(time(15, 00), self.run_weekends)

    def run_every_3s(self, arg, asdf = None):
        print(f'run_ever_3s: {datetime.now().replace(microsecond=0)} : {arg}, {asdf}')

    def run_mondays(self):
        print('Today is monday!')

    def run_workdays(self):
        print('Today is a workday!')

    def run_weekends(self):
        print('Finally weekend!')

MyRule()
```

## 14.2 Mirror openHAB events to a MQTT Broker

```
import HABApp
from HABApp.openhab.events import ItemStateEvent, ItemStateUpdatedEventFilter
from HABApp.openhab.items import OpenhabItem

class ExampleOpenhabToMQTTRule(HABApp.Rule):
    """This Rule mirrors all updates from OpenHAB to MQTT"""

    def __init__(self):
        super().__init__()

        for item in self.get_items(OpenhabItem):
            item.listen_event(self.process_update, ItemStateUpdatedEventFilter())

    def process_update(self, event):
        assert isinstance(event, ItemStateEvent)

        print(f'/openhab/{event.name} <- {event.value}')
        self.mqtt.publish(f'/openhab/{event.name}', str(event.value))

ExampleOpenhabToMQTTRule()
```

## 14.3 Trigger an event when an item is constant

Get an even when the item is constant for 5 and for 10 seconds.

```
import HABApp
from HABApp.core.items import Item
from HABApp.core.events import ItemNoChangeEvent, EventFilter

class MyRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

        my_item = Item.get_item('test_watch')

        # Create an event when the item doesn't change for 5 secs and
        # create a watcher for ItemNoChangeEvent with 5s const time
        my_item.watch_change(5).listen_event(self.item_constant_5s)

        # Just create an event when the item doesn't change for 10 secs
        my_item.watch_change(10)

        # Listen to all ItemNoChangeEvents for the item
        my_item.listen_event(self.item_constant, EventFilter(ItemNoChangeEvent))

        # Set the item to a value to generate the ItemNoChangeEvent events
```

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```

my_item.set_value('my_value')

def item_constant_5s(self, event):
    print(f'Item 5s const: {event}')

def item_constant(self, event):
    print(f'Item const: {event}')

MyRule()

```

```

Item 5s const: <ItemNoChangeEvent name: test_watch, seconds: 5>
Item const: <ItemNoChangeEvent name: test_watch, seconds: 5>
Item const: <ItemNoChangeEvent name: test_watch, seconds: 10>

```

## 14.4 Turn something off after movement

Turn a device off 30 seconds after one of the movement sensors in a room signals movement.

```

import HABApp
from HABApp.core.items import Item
from HABApp.core.events import ValueUpdateEvent, ValueUpdateEventFilter

class MyCountdownRule(HABApp.Rule):
    def __init__(self):
        super().__init__()

        self.countdown = self.run.countdown(30, self.switch_off)
        self.device = Item.get_item('my_device')

        self.movement1 = Item.get_item('movement_sensor1')
        self.movement1.listen_event(self.movement, ValueUpdateEventFilter())

        self.movement2 = Item.get_item('movement_sensor2')
        self.movement2.listen_event(self.movement, ValueUpdateEventFilter())

    def movement(self, event: ValueUpdateEvent):
        if self.device != 'ON':
            self.device.post_value('ON')

        self.countdown.reset()

    def switch_off(self):
        self.device.post_value('OFF')

MyCountdownRule()

```

## 14.5 Process Errors in Rules

This example shows how to create a rule with a function which will be called when **any** rule throws an error. The rule function then can push the error message to an openHAB item, use a notification service to send the error message to the mobile device or send an email with the error message. See *Advanced Usage* for more information about the available internal topics. It also uses the built in *rate limiter* to limit the amount of notifications.

```
import HABApp
from HABApp.core.events.habapp_events import HABAppException
from HABApp.core.events import EventFilter
from HABApp.util import RateLimiter

# Set up rate limiter to limit the amount of notifications
LIMITER = RateLimiter('MyNotifications')
LIMITER.parse_limits('5 in 1 minute', algorithm='fixed_window_elastic_expiry')
LIMITER.parse_limits('20 in 1 hour', algorithm='leaky_bucket')

class NotifyOnError(HABApp.Rule):
    def __init__(self):
        super().__init__()

        # Listen to all errors
        self.listen_event('HABApp.Errors', self.on_error, EventFilter(HABAppException))

    def on_error(self, error_event: HABAppException):
        msg = error_event.to_str() if isinstance(error_event, HABAppException) else
        ↪error_event

        # use limiter
        if not LIMITER.allow():
            return None

        # Replace this part with your notification logic
        print('Error in rules:')
        print(msg)

NotifyOnError()

# this is a faulty rule as an example. Do not create this part!
class FaultyRule(HABApp.Rule):
    def __init__(self):
        super().__init__()
        self.run.soon(self.faulty_function)

    def faulty_function(self):
        1 / 0
FaultyRule()
```

Error in rules:

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```
Exception in TestRule.FaultyRule.faulty_function: division by zero
File "<string>", line 46 in faulty_function
```

```
-----
Traceback (most recent call last):
```

```
  File "/home/docs/checkouts/readthedocs.org/user_builds/habapp/checkouts/latest/src/
↳ HABApp/core/internals/wrapped_function/wrapped_thread.py", line 94, in run
    self.func_obj(*self.func_args, **self.func_kwargs)
  File "<string>", line 46, in faulty_function
ZeroDivisionError: division by zero
```



## TIPS & TRICKS

### 15.1 yml files

#### 15.1.1 Entry sharing

If the values should be reused yml features anchors with `&` which then can be referenced with `*`. This allows to reuse the defined structures:

```
my_key_value_pairs: &my_kv # <-- this creates the anchor node with the name my_kv
  4: 99      # Light Threshold
  5: 8       # Operation Mode
  7: 20      # Customer Function

value_1: *my_kv # <-- '*my_kv' references the anchor node my_kv
value_2: *my_kv

value_3:
  <<: *my_kv # <-- '<<: *my_kv' references and inserts the content (!) of the anchor_
↪node my_kv
  4: 80      # and then overwrites parameter 4
```

### 15.2 openHAB

#### 15.2.1 autoupdate

If external devices are capable of reporting their state (e.g. Z-Wave) it is always advised to use `disable autoupdate` for these items. This prevents openHAB from guessing the item state based on the command and forces it to use the actual reported value. If in doubt if the device supports reporting their state it can be easily tested: Set `autoupdate` to off, then watch the item state after sending a command to it. If the state changes `autoupdate` can remain off.

In the `*.items` file `autoupdate` can be disabled by adding the following statement in the metadata field.

```
Number      MyItem      { channel = "zwave:my_zwave_link", autoupdate="false" }
```

It's also possible with textual thing configuration to add it as *metadata*.



## TROUBLESHOOTING

### 16.1 Warnings

#### 16.1.1 Starting of <FUNC\_NAME> took too long.

This warning appears in the HABApp log, e.g.:

```
Starting of MyRule.my_func took too long: 0.08s. Maybe there are not enough threads?
```

It means that the duration from when the event was received to the start of the execution of the function took longer than expected.

This can be the case if suddenly many events are received at once. Another reason for this warning might be that currently running function calls take too long to finish and thus no free workers are available. This can either be the case for complex calculations, but most of the time it's blocking function calls or a `time.sleep` call.

If these warnings pile up in the log it's an indicator that the worker is congested. Make sure there is no use of long sleeps and instead the scheduler is used.

If this warning only appears now and then it can be ignored.

#### 16.1.2 Execution of <FUNC\_NAME> took too long

This warning appears in the HABApp log, e.g.:

```
Execution of MyRule.my_long_func took too long: 15.25s
```

It means that the function took very long to execute. By default HABApp has 10 threads and each function call will happen in one of those threads. Normally this is not a problem because functions finish rather quickly and the used thread is free for the next function call. When functions take very long to execute and multiple of these functions run parallel it's possible that all threads are blocked. HABApp will then appear to “hang” and can not process new events.

If the function uses `time.sleep` it can be split up and the scheduler can be used instead.

Long running scripts (>10s) which do not interact with openHAB can be run as a separate process with `execute_python()`. The script can e.g. print the result as a json which HABApp can read and load again into the proper data structures.

If this warning only appears now and then it can be ignored.

### 16.1.3 Item <ITEM\_NAME> is a UoM item but “unit” is not found in item metadata

Starting from OH4 it's possible to use an internal normalisation unit and scale for UoM items. To use this normalisation one has to set the `unit` metadata on the item.:

```
Number:Temperature    My_Temp    { unit="°C" }
```

It's strongly recommend to explicitly set this normalisation value. Only when used it'll prevent graphs and persisted values from changing the unit and scale which would result in broken graphs or broken persisted data.

## 16.2 Errors

### 16.2.1 ValueError: Line is too long

The underlying libraries of HABApp use a buffer to process each request and event from openHAB. If the openHAB items contain images this buffer might be not enough and a `ValueError: Line is too long` error will appear in the logs. See [the openHAB connection options](#) on how to increase the buffer. The maximum image size that can be used without error is ~40% of the buffer size.



## CLASS REFERENCE

Reference for returned classes from some functions. These are not intended to be created by the user.

### 17.1 Watches

#### 17.1.1 ItemNoUpdateWatch

**class** `ItemNoUpdateWatch`(*name*, *secs*)

**EVENT**

alias of *ItemNoUpdateEvent*

**cancel()**

Cancel the item watch

**listen\_event**(*callback*)

Listen to (only) the event that is emitted by this watcher

#### 17.1.2 ItemNoChangeWatch

**class** `ItemNoChangeWatch`(*name*, *secs*)

**EVENT**

alias of *ItemNoChangeEvent*

**cancel()**

Cancel the item watch

**listen\_event**(*callback*)

Listen to (only) the event that is emitted by this watcher

## 17.2 Scheduler

### 17.2.1 OneTimeJob

**class** `OneTimeJob`(*parent*, *func*)

**cancel()**

Cancel the job.

**get\_next\_run()**

Return the next execution timestamp.

**Return type**

`datetime`

**remaining()**

Returns the remaining time to the next run or None if the job is not scheduled

**Return type**

`Optional[timedelta]`

**Returns**

remaining time as a timedelta or None

**to\_item**(*item*)

Sends the next execution (date)time to an item. Sends None if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (`str` | `BaseValueItem` | `None`) – item name or item, None to disable

### 17.2.2 CountdownJob

**class** `CountdownJob`(*parent*, *func*)

**cancel()**

Cancel the job.

**countdown**(*time*)

Set the time after which the job will be executed.

**Parameters**

**time** (`Union[timedelta, float, int]`) – time

**Return type**

`CountdownJob`

**get\_next\_run()**

Return the next execution timestamp.

**Return type**

`datetime`

**remaining()**

Returns the remaining time to the next run or None if the job is not scheduled

**Return type**

`Optional[timedelta]`

**Returns**

remaining time as a timedelta or None

**stop()**

Stops the countdown so it can be started again with a call to reset

**to\_item(item)**

Sends the next execution (date)time to an item. Sends None if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (`str` | `BaseValueItem` | `None`) – item name or item, None to disable

### 17.2.3 ReoccurringJob

**class** `ReoccurringJob(parent, func)`

**boundary\_func(func)**

Add a function which will be called when the datetime changes. Use this to implement custom boundaries. Use None to disable the boundary function.

**Parameters**

**func** (`Optional[Callable[[datetime], datetime]]`) – Function which returns a datetime obj, arg is a datetime with the next run time. Return `SKIP_EXECUTION` together with a reoccurring job to skip the proposed run time.

**Return type**

`DateTimeJobBase`

**cancel()**

Cancel the job.

**earliest(time\_obj)**

Set earliest boundary as time of day. None will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run earlier

**Return type**

`DateTimeJobBase`

**get\_next\_run()**

Return the next execution timestamp.

**Return type**

`datetime`

**interval(interval)**

Set the interval at which the task will run.

**Parameters**

**interval** (`Union[int, float, timedelta]`) – interval in secs or a timedelta obj

**Return type**

`ReoccurringJob`

**jitter**(*start*, *stop=None*)

Add a random jitter per call in the interval [*start* <= secs <= *stop*] to the next run. If *stop* is omitted *start* must be positive and the interval will be [*-start* <= secs <= *start*] Passing *None* as *start* will disable jitter.

**Parameters**

- **start** (`Union[int, float, None]`) – Interval start or *None* to disable jitter
- **stop** (`Union[int, float, None]`) – Interval stop or *None* to build interval based on *start*

**Return type**

`DateTimeJobBase`

**latest**(*time\_obj*)

Set latest boundary as time of day. *None* will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run later

**Return type**

`DateTimeJobBase`

**offset**(*timedelta\_obj*)

Set a constant offset to the calculation of the next run. *None* will disable the offset.

**Parameters**

**timedelta\_obj** (`Optional[timedelta]`) – constant offset

**Return type**

`DateTimeJobBase`

**remaining**()

Returns the remaining time to the next run or *None* if the job is not scheduled

**Return type**

`Optional[timedelta]`

**Returns**

remaining time as a `timedelta` or *None*

**to\_item**(*item*)

Sends the next execution (date)time to an item. Sends *None* if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (`str | BaseValueItem | None`) – item name or item, *None* to disable

## 17.2.4 DayOfWeekJob

**class** `DayOfWeekJob`(*parent*, *func*)

**boundary\_func**(*func*)

Add a function which will be called when the datetime changes. Use this to implement custom boundaries. Use *None* to disable the boundary function.

**Parameters**

**func** (`Optional[Callable[[datetime], datetime]]`) – Function which returns a datetime obj, arg is a datetime with the next run time. Return `SKIP_EXECUTION` together with a reoccurring job to skip the proposed run time.

**Return type**

DateTimeJobBase

**cancel()**

Cancel the job.

**earliest**(*time\_obj*)

Set earliest boundary as time of day. None will disable boundary.

**Parameters****time\_obj** (*Optional*[*time*]) – time obj, scheduler will not run earlier**Return type**

DateTimeJobBase

**get\_next\_run()**

Return the next execution timestamp.

**Return type***datetime***jitter**(*start*, *stop=None*)Add a random jitter per call in the interval [*start* <= secs <= *stop*] to the next run. If *stop* is omitted *start* must be positive and the interval will be [*-start* <= secs <= *start*] Passing *None* as *start* will disable jitter.**Parameters**

- **start** (*Union*[*int*, *float*, *None*]) – Interval start or *None* to disable jitter
- **stop** (*Union*[*int*, *float*, *None*]) – Interval stop or *None* to build interval based on start

**Return type**

DateTimeJobBase

**latest**(*time\_obj*)

Set latest boundary as time of day. None will disable boundary.

**Parameters****time\_obj** (*Optional*[*time*]) – time obj, scheduler will not run later**Return type**

DateTimeJobBase

**offset**(*timedelta\_obj*)

Set a constant offset to the calculation of the next run. None will disable the offset.

**Parameters****timedelta\_obj** (*Optional*[*timedelta*]) – constant offset**Return type**

DateTimeJobBase

**remaining()**Returns the remaining time to the next run or *None* if the job is not scheduled**Return type***Optional*[*timedelta*]**Returns**remaining time as a *timedelta* or *None*

**time**(*time*)

Set a time of day when the job will run.

**Parameters**

**time** (`Union[time, datetime]`) – time

**Return type**

DayOfWeekJob

**to\_item**(*item*)

Sends the next execution (date)time to an item. Sends `None` if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (`str | BaseValueItem | None`) – item name or item, `None` to disable

**weekdays**(*weekdays*)

Set the weekdays when the job will run.

**Parameters**

**weekdays** (`Union[str, Iterable[Union[str, int]]]`) – Day group names (e.g. 'all', 'weekend', 'workdays'), an iterable with day names (e.g. ['Mon', 'Fri']) or an iterable with the isoweekday values (e.g. [1, 5]).

**Return type**

DayOfWeekJob

## 17.2.5 DawnJob

**class** `DawnJob`(*parent*, *func*)

**boundary\_func**(*func*)

Add a function which will be called when the datetime changes. Use this to implement custom boundaries. Use `None` to disable the boundary function.

**Parameters**

**func** (`Optional[Callable[[datetime], datetime]]`) – Function which returns a datetime obj, arg is a datetime with the next run time. Return `SKIP_EXECUTION` together with a reoccurring job to skip the proposed run time.

**Return type**

DateTimeJobBase

**cancel**()

Cancel the job.

**earliest**(*time\_obj*)

Set earliest boundary as time of day. `None` will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run earlier

**Return type**

DateTimeJobBase

**get\_next\_run**()

Return the next execution timestamp.

**Return type**  
`datetime`

**jitter**(*start*, *stop=None*)

Add a random jitter per call in the interval [*start* <= secs <= *stop*] to the next run. If *stop* is omitted *start* must be positive and the interval will be [*-start* <= secs <= *start*] Passing *None* as *start* will disable jitter.

**Parameters**

- **start** (`Union[int, float, None]`) – Interval start or *None* to disable jitter
- **stop** (`Union[int, float, None]`) – Interval stop or *None* to build interval based on start

**Return type**  
`DateTimeJobBase`

**latest**(*time\_obj*)

Set latest boundary as time of day. *None* will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run later

**Return type**  
`DateTimeJobBase`

**offset**(*timedelta\_obj*)

Set a constant offset to the calculation of the next run. *None* will disable the offset.

**Parameters**

**timedelta\_obj** (`Optional[timedelta]`) – constant offset

**Return type**  
`DateTimeJobBase`

**remaining**()

Returns the remaining time to the next run or *None* if the job is not scheduled

**Return type**  
`Optional[timedelta]`

**Returns**  
 remaining time as a `timedelta` or *None*

**to\_item**(*item*)

Sends the next execution (date)time to an item. Sends *None* if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (`str | BaseValueItem | None`) – item name or item, *None* to disable

## 17.2.6 SunriseJob

**class SunriseJob**(*parent*, *func*)

**boundary\_func**(*func*)

Add a function which will be called when the datetime changes. Use this to implement custom boundaries. Use *None* to disable the boundary function.

**Parameters**

**func** (`Optional[Callable[[datetime], datetime]]`) – Function which returns a datetime obj, arg is a datetime with the next run time. Return `SKIP_EXECUTION` together with a reoccurring job to skip the proposed run time.

**Return type**

`DateTimeJobBase`

**cancel()**

Cancel the job.

**earliest**(*time\_obj*)

Set earliest boundary as time of day. `None` will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run earlier

**Return type**

`DateTimeJobBase`

**get\_next\_run()**

Return the next execution timestamp.

**Return type**

`datetime`

**jitter**(*start*, *stop*=`None`)

Add a random jitter per call in the interval [`start` <= secs <= `stop`] to the next run. If `stop` is omitted `start` must be positive and the interval will be [`-start` <= secs <= `start`] Passing `None` as `start` will disable jitter.

**Parameters**

- **start** (`Union[int, float, None]`) – Interval start or `None` to disable jitter
- **stop** (`Union[int, float, None]`) – Interval stop or `None` to build interval based on start

**Return type**

`DateTimeJobBase`

**latest**(*time\_obj*)

Set latest boundary as time of day. `None` will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run later

**Return type**

`DateTimeJobBase`

**offset**(*timedelta\_obj*)

Set a constant offset to the calculation of the next run. `None` will disable the offset.

**Parameters**

**timedelta\_obj** (`Optional[timedelta]`) – constant offset

**Return type**

`DateTimeJobBase`

**remaining()**

Returns the remaining time to the next run or `None` if the job is not scheduled

**Return type**

`Optional[timedelta]`



**Returns**

remaining time as a timedelta or None

**to\_item**(*item*)

Sends the next execution (date)time to an item. Sends None if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (*str* | *BaseValueItem* | *None*) – item name or item, None to disable

## 17.2.7 SunsetJob

**class** *SunsetJob*(*parent*, *func*)

**boundary\_func**(*func*)

Add a function which will be called when the datetime changes. Use this to implement custom boundaries. Use None to disable the boundary function.

**Parameters**

**func** (*Optional*[*Callable*[[*datetime*], *datetime*]]) – Function which returns a datetime obj, arg is a datetime with the next run time. Return *SKIP\_EXECUTION* together with a reoccurring job to skip the proposed run time.

**Return type**

*DateTimeJobBase*

**cancel**()

Cancel the job.

**earliest**(*time\_obj*)

Set earliest boundary as time of day. None will disable boundary.

**Parameters**

**time\_obj** (*Optional*[*time*]) – time obj, scheduler will not run earlier

**Return type**

*DateTimeJobBase*

**get\_next\_run**()

Return the next execution timestamp.

**Return type**

*datetime*

**jitter**(*start*, *stop=None*)

Add a random jitter per call in the interval [*start* <= secs <= *stop*] to the next run. If *stop* is omitted *start* must be positive and the interval will be [*-start* <= secs <= *start*] Passing None as *start* will disable jitter.

**Parameters**

- **start** (*Union*[*int*, *float*, *None*]) – Interval start or None to disable jitter
- **stop** (*Union*[*int*, *float*, *None*]) – Interval stop or None to build interval based on start

**Return type**

*DateTimeJobBase*

**latest**(*time\_obj*)

Set latest boundary as time of day. `None` will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run later

**Return type**

`DateTimeJobBase`

**offset**(*timedelta\_obj*)

Set a constant offset to the calculation of the next run. `None` will disable the offset.

**Parameters**

**timedelta\_obj** (`Optional[timedelta]`) – constant offset

**Return type**

`DateTimeJobBase`

**remaining**()

Returns the remaining time to the next run or `None` if the job is not scheduled

**Return type**

`Optional[timedelta]`

**Returns**

remaining time as a `timedelta` or `None`

**to\_item**(*item*)

Sends the next execution (date)time to an item. Sends `None` if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters**

**item** (`str` | `BaseValueItem` | `None`) – item name or item, `None` to disable

## 17.2.8 DuskJob

**class DuskJob**(*parent, func*)**boundary\_func**(*func*)

Add a function which will be called when the datetime changes. Use this to implement custom boundaries. Use `None` to disable the boundary function.

**Parameters**

**func** (`Optional[Callable[[datetime], datetime]]`) – Function which returns a datetime obj, arg is a datetime with the next run time. Return `SKIP_EXECUTION` together with a reoccurring job to skip the proposed run time.

**Return type**

`DateTimeJobBase`

**cancel**()

Cancel the job.

**earliest**(*time\_obj*)

Set earliest boundary as time of day. `None` will disable boundary.

**Parameters**

**time\_obj** (`Optional[time]`) – time obj, scheduler will not run earlier

**Return type**

DateTimeJobBase

**get\_next\_run()**

Return the next execution timestamp.

**Return type**

datetime

**jitter**(start, stop=None)

Add a random jitter per call in the interval [start <= secs <= stop] to the next run. If stop is omitted start must be positive and the interval will be [-start <= secs <= start] Passing None as start will disable jitter.

**Parameters**

- **start** (Union[int, float, None]) – Interval start or None to disable jitter
- **stop** (Union[int, float, None]) – Interval stop or None to build interval based on start

**Return type**

DateTimeJobBase

**latest**(time\_obj)

Set latest boundary as time of day. None will disable boundary.

**Parameters****time\_obj** (Optional[time]) – time obj, scheduler will not run later**Return type**

DateTimeJobBase

**offset**(timedelta\_obj)

Set a constant offset to the calculation of the next run. None will disable the offset.

**Parameters****timedelta\_obj** (Optional[timedelta]) – constant offset**Return type**

DateTimeJobBase

**remaining**()

Returns the remaining time to the next run or None if the job is not scheduled

**Return type**

Optional[timedelta]

**Returns**

remaining time as a timedelta or None

**to\_item**(item)

Sends the next execution (date)time to an item. Sends None if the job is not scheduled. Every time the scheduler updates to a new (date)time the item will also receive the updated time.

**Parameters****item** (str | BaseValueItem | None) – item name or item, None to disable



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