



Inteligentne budynki

mgr inż. Jerzy Sobczyk

Oprogramowanie



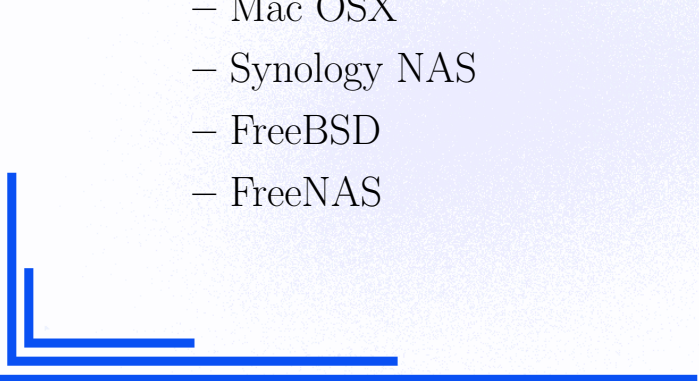
Plan wykładu

- Domoticz <https://www.domoticz.com/>
- OpenHab <https://www.openhab.org/>
- HomeAssistant <https://www.home-assistant.io/>
- Other platforms



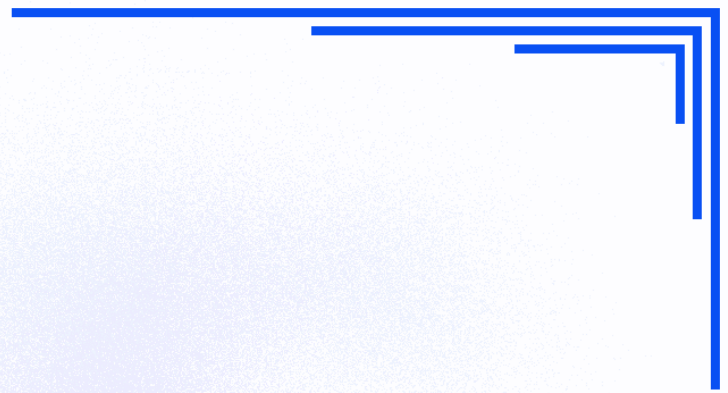
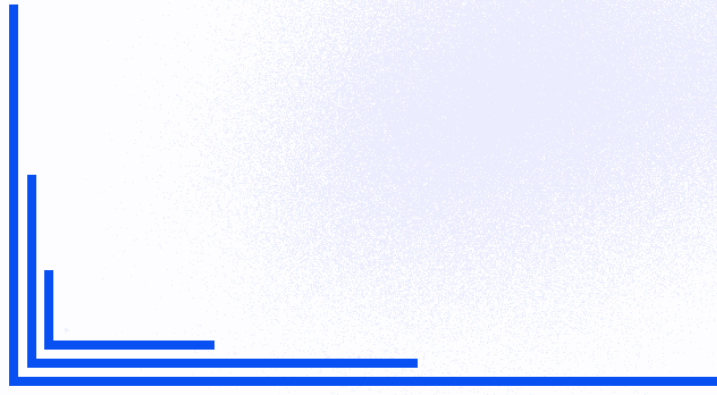
Domoticz



- Domoticz to bardzo lekki system automatyki domowej pozwalający na monitorowanie i konfigurowanie różnych urządzeń takich jak oświetlenie, przełączniki, rozmaite czujniki/mierniki temperatury, deszczu, wiatru, ultrafioletu, zużycia energii elektrycznej, zużycia gazu, zużycia wody i wielu innych. Powiadomienia/alarmy mogą być wysyłane na urządzenia mobilne.
 - Domoticz ma otwarte źródła i jest darmowy!
 - Może działać w systemach:
 - Raspberry Pi
 - Windows
 - Linux
 - Mac OSX
 - Synology NAS
 - FreeBSD
 - FreeNAS
- 



Domoticz - panel



Dashticz woensdag 12 juli 2017 21:44 

 **16°C** Eindhoven

 **Voordeur**
DICHT
12-07-17 18:13

 **21.9°C**
Woonkamer
12-07-17 21:40

 **0 Bft, 314°** NW
Kracht
12-07-17 21:40



wo 22:05
Buienradar.nl

donderdag
13/7



21°C
11°C

vrijdag
14/7



20°C
12°C

zaterdag
15/7



23°C
14°C

zondag
16/7



27°C
16°C

 **45.0mm**
Regen
12-07-17 21:40

 **10.0 km**
Zicht
12-07-17 21:40

 **388 Watt**
Energieverbruik
12-07-17 21:40

 **9.036 kWh**
Energie vandaag
12-07-17 21:40

 **0.610 m3**
Gas vandaag
12-07-17 21:40

 **33.55%**
CPU
12-07-17 21:44

 **Woonkamer**
AAN
11-07-17 23:09

 **Slaapkamer**
UIT
12-07-17 01:45

 **91.40%**
NAS Harddisk
12-07-17 21:44

 **67 Mbit/s**
Download
12-07-17 21:00

 **14.51 Mbit/s**
Upload
12-07-17 21:00

 **Tuinhuus**
UIT
12-07-17 01:00

 **Tuin**
UIT
25-06-17 22:32

 **Kleur 72%** / 12-07-17 20:20



 **Helft**
UIT
01-07-17 23:04

 **Helft Groot**
UIT
01-07-17 23:04

 **Do 13.07 08:00 - 09:00 - Rob thuis**
Do 13.07 10:00 - 11:00 - **Jordy**
Vr 14.07 Hele dag - **[redacted] Klaar**
Ma 17.07 Hele dag - **Dennis vrij**
Dj 18.07 10:00 - 11:00 - **Robbert**
Wo 19.07 09:00 - 17:00 - **Werken**
Do 20.07 Hele dag - **Werken @ TIP**

 **21:56** - Lijn 156 - Eindhoven
22:07 - Lijn 157 - Oss
22:31 - Lijn 157 - Eindhoven
22:38 - Lijn 156 - Den Bosch
22:56 - Lijn 156 - Eindhoven
23:07 - Lijn 157 - Uden
Hobostraat

 **16.0°C**
Verwarming



 **Ventilatie** / 09-07-17 12:36



 **Eettafel** / 12-07-17 07:53



 21:30 - 21:59 - **RTL 5 - Foute vrienden USA**
21:15 - 22:05 - **NPO 3 - Ranking the stars**
21:30 - 22:25 - **NPO 1 - De avondetappe**
21:59 - 22:27 - **RTL 5 - Foute vrienden USA**
21:30 - 22:31 - **RTL 7 - Transporter**

 **Plastic: Vandaag**
GFT: Maandag
Plastic: 19-07-2017
Rest: 24-07-2017
GFT: 24-07-2017

 **Despacito** - ...
Luis Fonsi, ...
0:02

Selecteer afspeellijst »

Q-music

◀ ▶ ▷

 **Nos**

 **Tweakers**

 **Nu.nl**

<https://github.com/Dashticz/dashticz>

Domoticz - panel w stylu Aurora

The screenshot displays the Domoticz Aurora theme dashboard with a dark blue background and a sidebar on the left. The dashboard is organized into four main columns: Scenes, Light/Switch Devices, Temperature Sensors, and Utility Sensors.

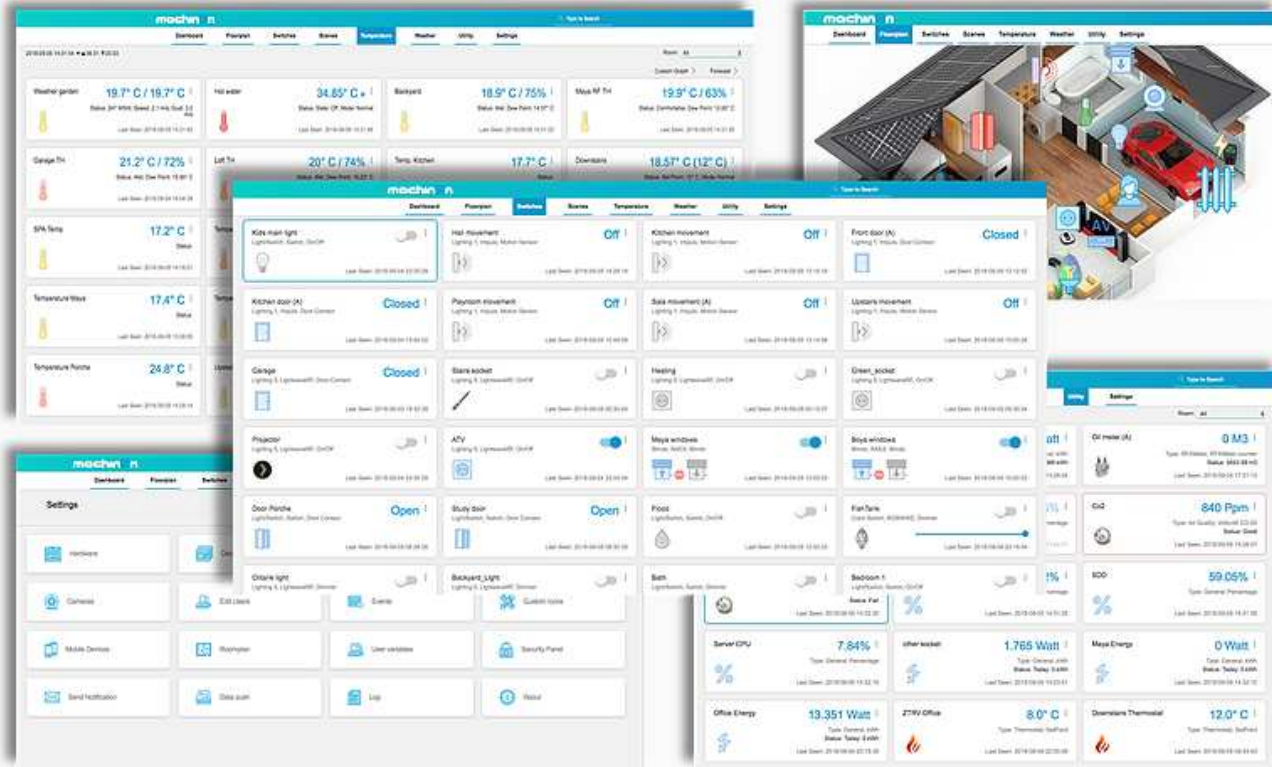
- Scenes:** Contains three 'Mixed' scene cards. The first is labeled 'SOVA' and '22 Hours Ago'. The second is labeled 'STÅDA' and '10 Days Ago'. The third is labeled 'TITTA PÅ TV'.
- Light/Switch Devices:** Contains two cards. The first is 'VRUM GARDIN SYD' with a 'Closed' status and a window icon, updated '2 Hours Ago'. The second is 'BAD WHITE' with a lightbulb icon and 'Off' status, updated '43 Minutes Ago'. A third card 'BAD SKÅP' is partially visible at the bottom with a '11 %' status.
- Temperature Sensors:** Contains three cards. 'SOV TEMP' shows '22.9° C / 34%' and 'Comfortable' status, updated '3 Minutes Ago'. 'UTE' shows weather data: 'Vind: -1.9° C', 'Temp: -4.5° C / 95%', 'Vind: NNW / 1.2 M/S', and 'Regn: 0 Mm', updated '11 Seconds Ago'. 'KRYPGRUND TEMP' shows '4.9° C / 90%'.
- Utility Sensors:** Contains one card 'ENERGI' showing '1440 Watt' and 'Today: 49.3 kWh', updated '8 Seconds Ago'.

A sidebar on the left contains icons for home, scenes, light, temperature, utility, and other functions.

https://www.domoticz.com/wiki/Aurora_Theme



Domoticz - styl Machinon



https://www.domoticz.com/wiki/Machinon_Theme



Domoticz - skrypty

- Blocky to graficzny interfejs do JavaScriptu wyglądający podobnie do Scratcha.
- Skrypty Lua i DzVents mogą być zapisane w bazie lub w systemie plików.
- Skrypty w językach Bash, Python, Perl, ... działają na zewnątrz programu Domoticz i wykorzystują JSON API do pobierania danych z Domoticza i wysyłania powiadomień, zgłaszania zdarzeń, modyfikowania zmiennych, ...
- JSON API
`http://[username:password@]domoticz-ip[:port]/json.htm?api-call`

```
{  
  "status" : "OK"  
}
```

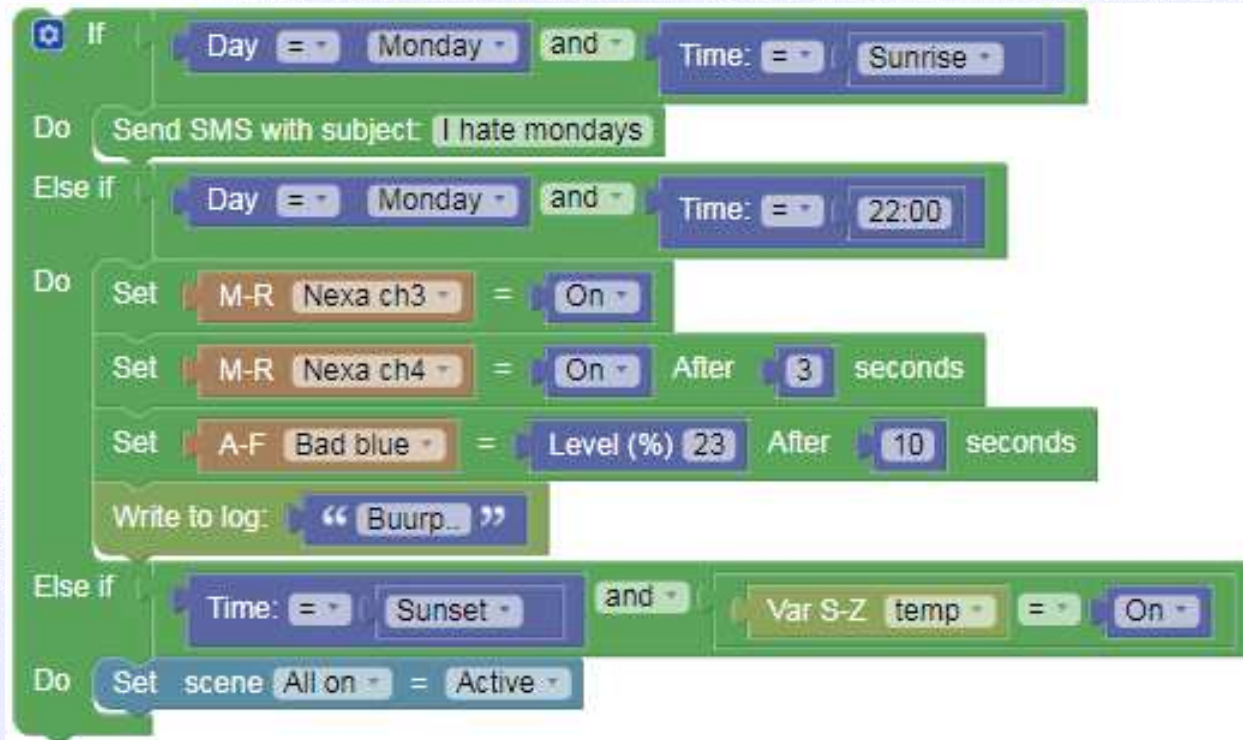



Domoticz - Blockly

- Blockly to również biblioteka dla JavaScriptu do tworzenia blokowych, graficznych języków programowania i edytorów.
- Zwykle jest uruchamiany w przeglądarce i przypomina język Scratch.
- Jest projektem Google.
- Jest darmowy i ma otwarte źródła.
- Jest udostępniany na licencji Apache 2.0.

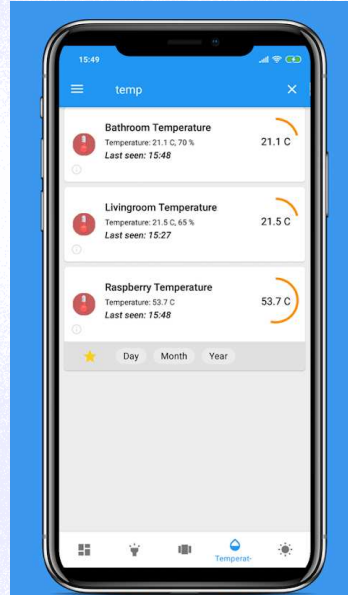
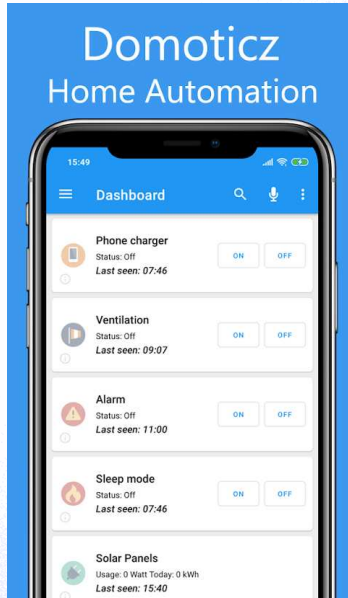
<https://en.wikipedia.org/wiki/Blockly>

Domoticz - Blockly



<https://www.domoticz.com/wiki/Blockly>

Domoticz - Android App



<https://play.google.com/store/apps/details?id=nl.hnogames.domoticz>

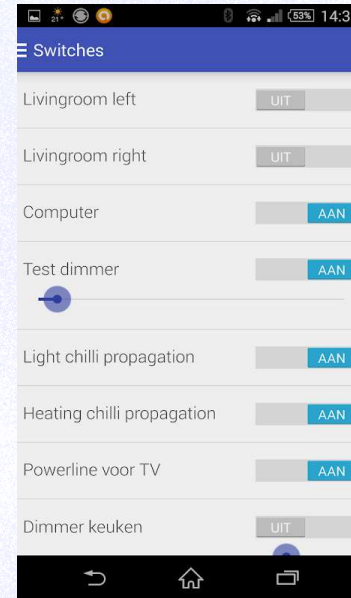
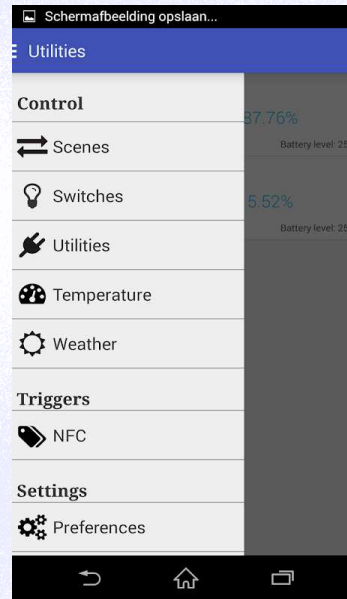
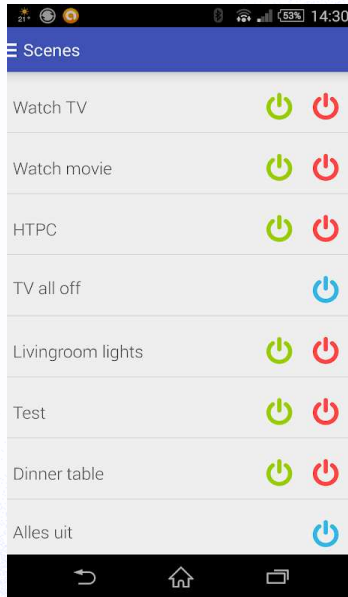
Domoticz - Android Imperi Home



<https://www.domoticz.com/wiki/ImperiHome>



Domoticz - Android Dromotica

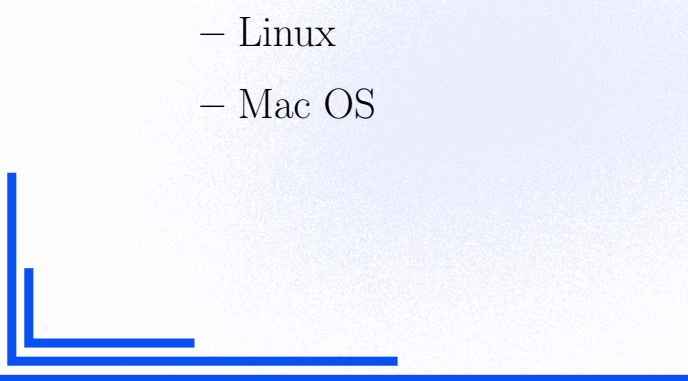


<https://play.google.com/store/apps/details?id=me.sebastiaanschimmel.dromotica>



OpenHAB



- OpenHAB czyli "The open **H**ome **A**utomation **B**us" to technologia o otwartym źródle niezależna od rodzajów systemów automatyki domowej działająca w centrum inteligentnego domu!
 - OpenHAB 2 jest tworzony w języku Java.
 - OpenHAB wykorzystuje OSGi dla modularności.
 - OpenHAB używa serwera Apache Karaf jako pojemnika wraz z Eclipse Equinox jako środowiska wykonania OSGi. Jako serwer HTTP jest dołączony Jetty.
 - OpenHAB można zainstalować na:
 - Raspberry Pi
 - Windows
 - Linux
 - Mac OS
 - Armbian
 - openHABian
 - Synology DiskStation
 - QNAP NAS
- 

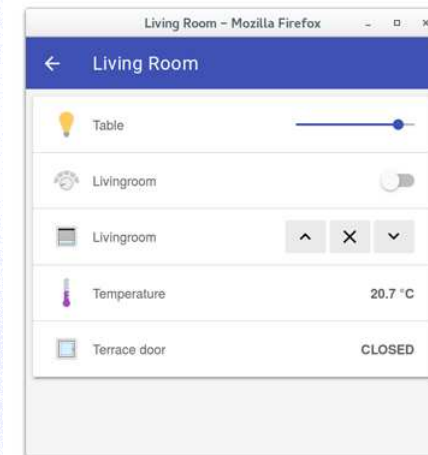


OpenHAB - UI

- The Paper UI
 - Add-on management,
 - Thing discovery,
 - Linking,
 - Items, sitemaps, persistence configurations and rules have to be defined in configuration files.
- The Basic UI
 - This interface is used to present the different sitemaps.
 - Web interface.
 - AJAX navigation,
 - Live update.
- The Classic UI
 - The Classic UI offers the same services that the Basic UI but with a different look and feel, close to an old iOS one.

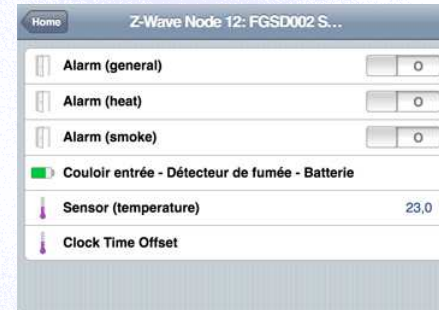


OpenHAB - Basic UI



<https://www.openhab.org/docs/tutorial/uis.html>

OpenHAB - Classic UI



<https://www.openhab.org/docs/tutorial/uis.html>



OpenHAB - Bindings

- Bindings integrate physical hardware, external systems and web services in openHAB. There are over 390 bindings.
- Popular bindings include:
 - Astro
 - Bluetooth
 - D-Link Smart Home
 - HUE
 - KNX
 - KODI
 - MQTT
 - nest
 - Network
 - Gardena
 - HTTP
 - Mi
 - RFXCOM
 - SONOS
 - IKEA
 - ZigBee
 - Z-Wave



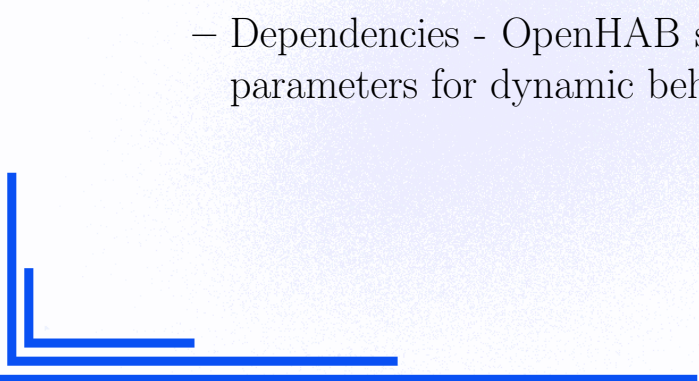
OpenHAB - Things

- Things are the starting point for configuring physical entities in openHAB.
- Configuring the Thing:
 1. Identify the binding required for the Thing
 2. Install the binding if it has not already been installed
 3. Define and configure the Thing
 4. Identify the Channels provided by the Thing
 5. Add Items and link them to the Thing's Channels
 6. At this point Items can be used to control the Thing or consume its information in e.g. Sitemaps or Rules



OpenHAB - Items, sitemaps



- Items represent all properties and capabilities of the user's home automation.
 - A collection of Things and Items represent physical or logical objects in the user's home automation setup.
 - Sitemaps are used to select and prepare these elements in order to compose a user-oriented presentation of this setup for various UI's.
 - Sitemap concepts:
 - Elements - Elements present information, allow interaction and are highly configurable based on the system state.
 - Parameters - A certain set of parameters can be configured to customize the presentation of an element.
 - Blocks - Multiple elements can be nested inside or behind others.
 - Dependencies - OpenHAB supports dependencies for system state and possible interactions by providing parameters for dynamic behavior.
- 



OpenHAB - Persistences, Rules

- Persistence is a data store used to keep data over the time.
- Rules are used for automating processes. Each rule can be triggered, which invokes a script that performs any kinds of tasks. physical or logical objects in the user's home automation setup.
- Transformations are used to translate data from a cluttered or technical raw value to a processed or human-readable representation.
- Actions are predefined methods that are called from openHAB rules and scripts. They can be used to execute openHAB-specific operations or to send commands or data to external hardware or services.

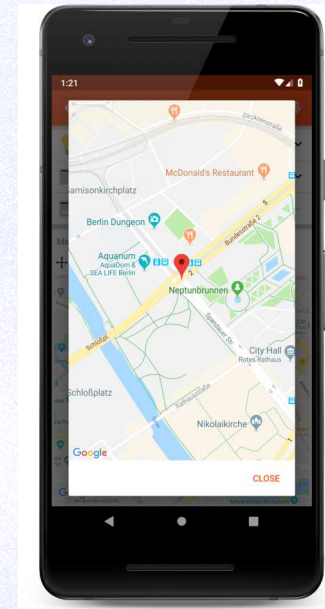
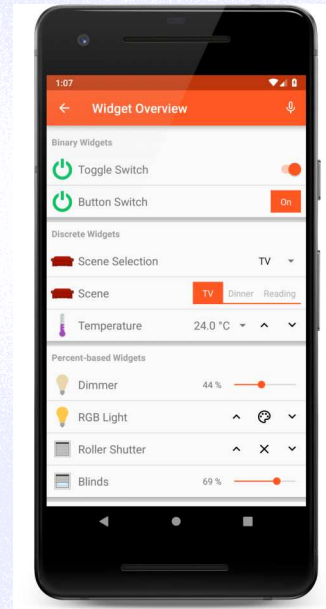
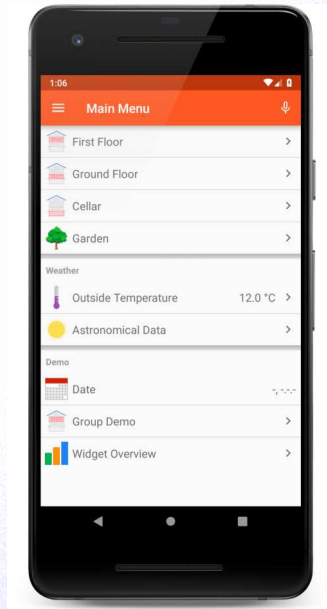


OpenHAB - Scripting

- Languages are known to work well for openHAB scripting:
 - JSR223 - standard scripting API for Java Virtual Machine,
 - Jython (Python on the JVM),
 - Nashorn Javascript (ECMAScript implementation included in JDK8 through 10, deprecated in 11),
 - Apache Groovy (JVM scripting language).



OpenHAB - Android App



<https://www.openhab.org/docs/apps/android.html>



Home Assistant

- Home Assistant to system automatyki domowej o otwartym źródle stawiający na sterowanie lokalne i prywatność.
- Jest rozwijany przez ogólnoswiatową społeczność programistów i majsterkowiczów.
- Zalecany sprzęt: Raspberry Pi 4 model B.
- Jest konfigurowany w języku YAML.
- Wykorzystuje bazę danych SQLite.
- Współpracuje z:
 - Amazon Alexa
 - ecobee
 - ESPHome
 - IFTTT
 - IKEA TRÅDFRI
 - MQTT
 - Philips Hue
 - Plax Media Server
 - SmartThings
 - SONOS
 - Z-Wave
 - ZigBee

Home Assistant - User Interface



<https://www.home-assistant.io/lovelace/>



Home Assistant - config

```
homeassistant:
  name: Home
  latitude: 52.15
  longitude: 20.98
  elevation: 106
  unit_system: metric
  time_zone: Europe/Warsaw
  external_url: "https://www.example.com"
  internal_url: "http://homeassistant.local:8123"
  allowlist_external_dirs:
    - /usr/var/dumping-ground
    - /tmp
  allowlist_external_urls:
    - "http://images.com/image1.png"

automation: !include automation.yaml
```



Home Assistant - device config

Two styles of configuration.

```
# Collect every entity under the \parent"
sensor:
  - platform: mqtt
    state_topic: "home/bedroom/temperature"
    name: "MQTT Sensor 1"
  - platform: mqtt
    state_topic: "home/kitchen/temperature"
    name: "MQTT Sensor 2"
  - platform: rest
    resource: http://IP_ADDRESS/ENDPOINT
    name: "Weather"

switch:
  - platform: vera
```

```
# List each device separately
sensor bedroom:
  platform: mqtt
  state_topic: "home/bedroom/temperature"
  name: "MQTT Sensor 1"

sensor kitchen:
  platform: mqtt
  state_topic: "home/kitchen/temperature"
  name: "MQTT Sensor 2"

sensor weather:
  platform: rest
  resource: http://IP_ADDRESS/ENDPOINT
  name: "Weather"

switch 1:
  platform: vera

switch 2:
  platform: vera
```

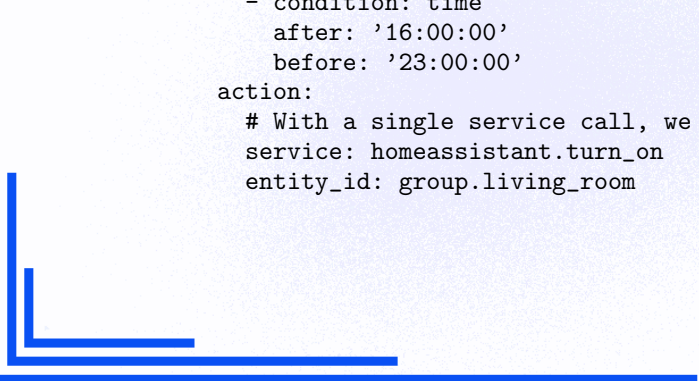


Home Assistant - rules



```
# Turns on lights 1 hour before sunset if people are home
# and if people get home between 16:00-23:00
- alias: 'Rule 1 Light on in the evening'
  trigger:
    # Prefix the first line of each trigger configuration
    # with a '-' to enter multiple
    - platform: sun
      event: sunset
      offset: '-01:00:00'
    - platform: state
      entity_id: all
      to: 'home'
  condition:
    # Prefix the first line of each condition configuration
    # with a '-' to enter multiple
    - condition: state
      entity_id: all
      state: 'home'
    - condition: time
      after: '16:00:00'
      before: '23:00:00'
  action:
    # With a single service call, we don't need a '-' before service - though you can if you want to
    service: homeassistant.turn_on
    entity_id: group.living_room

# Turn off lights when everybody leaves the house
- alias: 'Rule 2 - Away Mode'
  trigger:
    platform: state
    entity_id: all
    to: 'not_home'
  action:
    service: light.turn_off
    entity_id: all
```





Home Assistant - triggers

```
automation:
  trigger:
    platform: numeric_state
    entity_id: sensor.temperature
    # Optional
    value_template: "{{ state.attributes.battery }}"
    # At least one of the following required
    above: 17
    below: 25

    # If given, will trigger when condition has been for X time,
    # can also use days and milliseconds.
  for:
    hours: 1
    minutes: 10
    seconds: 5
```

```
automation:
  trigger:
    platform: state
    entity_id: device_tracker.paulus, device_tracker.anne_thereese
    # Optional
    from: "not_home"
    # Optional
    to: "home"

    # If given, will trigger when state has been the to state for X time.
    for: "01:10:05"
```



Home Assistant - actions



automation:

```
# Change the light in the kitchen and living room
# to 150 brightness and color red.
trigger:
  platform: sun
  event: sunset
action:
  service: light.turn_on
  data:
    brightness: 150
    rgb_color: [255, 0, 0]
    entity_id:
      - light.kitchen
      - light.living_room
```

automation 2:

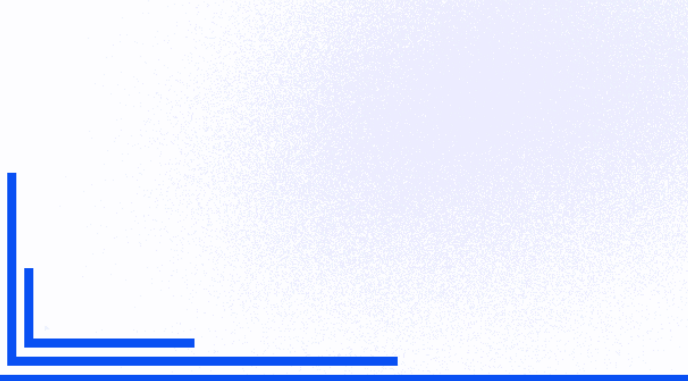
```
# Notify me on my mobile phone of an event
trigger:
  platform: sun
  event: sunset
  offset: -00:30
action:
  # Actions are scripts so can also be a list of actions
  - service: notify.notify
    data:
      message: Beautiful sunset!
  - delay: 0:35
  - service: notify.notify
    data:
      message: Oh wow you really missed something great.
```



Home Assistant - scenes



```
scene:
- name: Romantic
  entities:
    light.tv_back_light: "on"
    light.ceiling:
      state: "on"
      xy_color: [0.33, 0.66]
      brightness: 200
- name: Movies
  entities:
    light.tv_back_light:
      state: "on"
      brightness: 125
    light.ceiling: off
    media_player.sony_bravia_tv:
      state: "on"
      source: HDMI 1
      state: "on"
```





Inne platformy

- OpenMotics <https://www.openmotics.com/>
- Eventghost <http://www.eventghost.net/>
- ioBroker <https://www.iobroker.net/>
- AGO Control <https://www.agocontrol.com/>
- FHEM <http://fhem.de/fhem.html>
- Calaos <https://calaos.fr/en/>
- Pimatic <https://pimatic.org/>
- Homebridge <https://homebridge.io/>
- Smarthomatic <https://www.smarthomatic.org/>
- Jeedom <https://www.jeedom.com/site/en/index.html>
- MyController <https://www.mycontroller.org/#/home>
- PiDome <https://pidome.org/>
- HomeGenie <http://homegenie.it/>
- *Samsung SmartThings* <https://www.smartthings.com/>
- *HomeSeer* <https://homeseer.com/>
- ...

Pozycje wypisane w kolorze *pomarańczowym* nie udostępniają źródeł.



Powtórzenie

- Jakie elementy są niezbędne w platformach automatyki domowej?
- Co to są elementy (Items), wyzwacze (Triggers), akcje (Actions) i sceny (Scenes)?



Pytania?

