

# PSI3542 – 2022

## SISTEMAS EMBARCADOS PARA IOT

AULA 12 – HOME ASSISTANT E DISPOSITIVOS ESPHOME

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# Desafios com a IoT

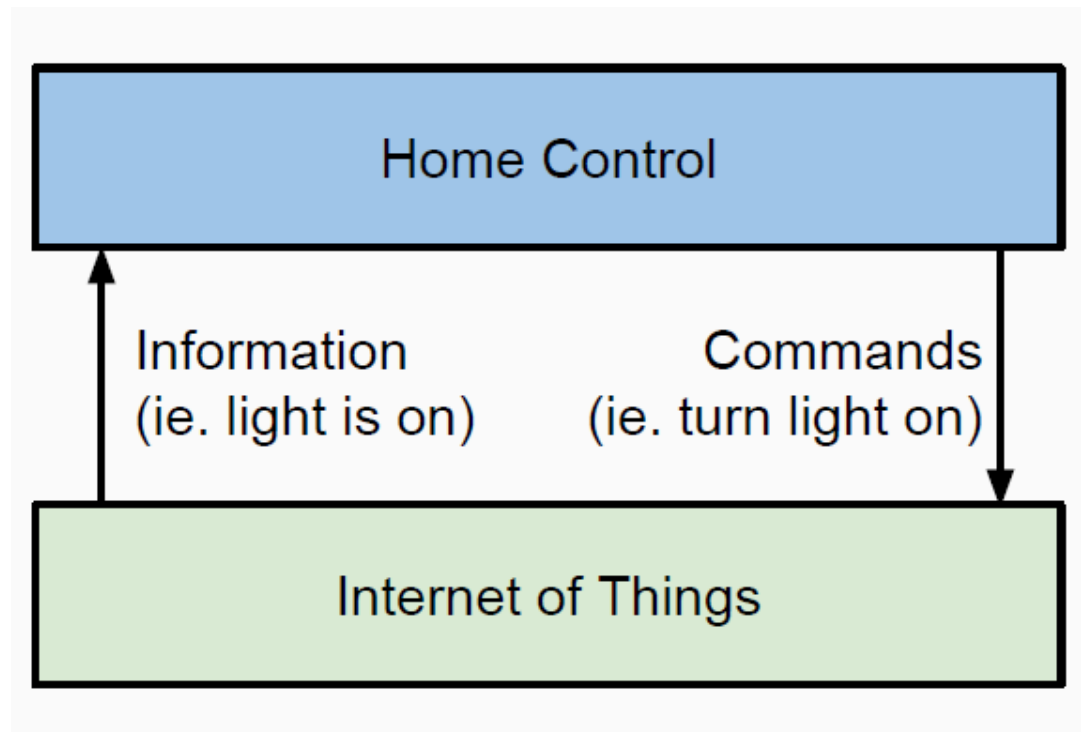
- Falta de padrão em comum nos dispositivos inteligentes de IoT.
  - Alguns usam WiFi para se conectar à sua própria nuvem.
  - Muitos protocolos de automação residencial.
- Cada dispositivo vem com seu próprio aplicativo.
  - Falta de um ponto único de controle.
  - Falta de automação que cubra diferentes produtos.
- Hubs procuram resolver estes problemas.

# Challenges

- More IoT devices with different protocols
- Many own apps
- More data
- More scenarios
- Privacy and trust
- Easy to use

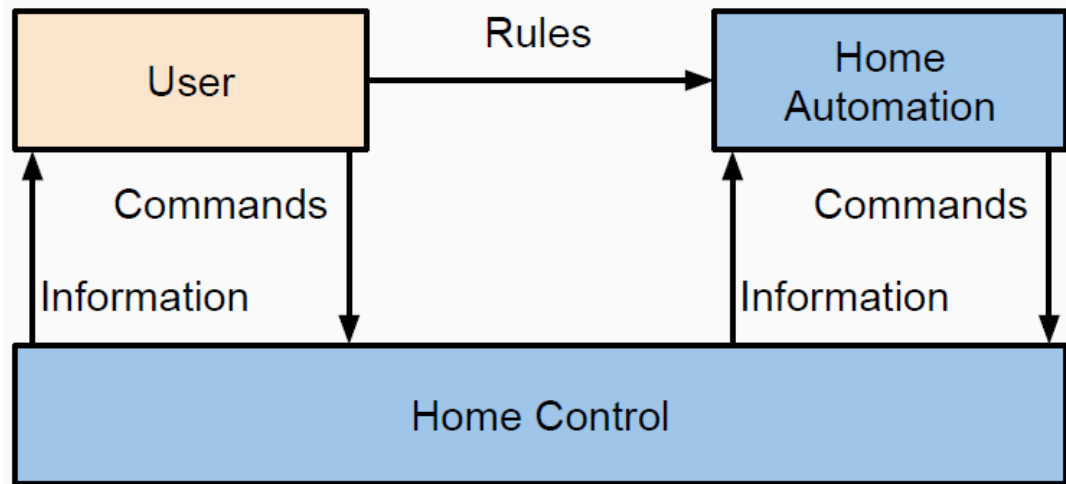
<https://www.home-assistant.io/blog/2014/12/26/home-control-home-automation-and-the-smart-home/>

# Hub

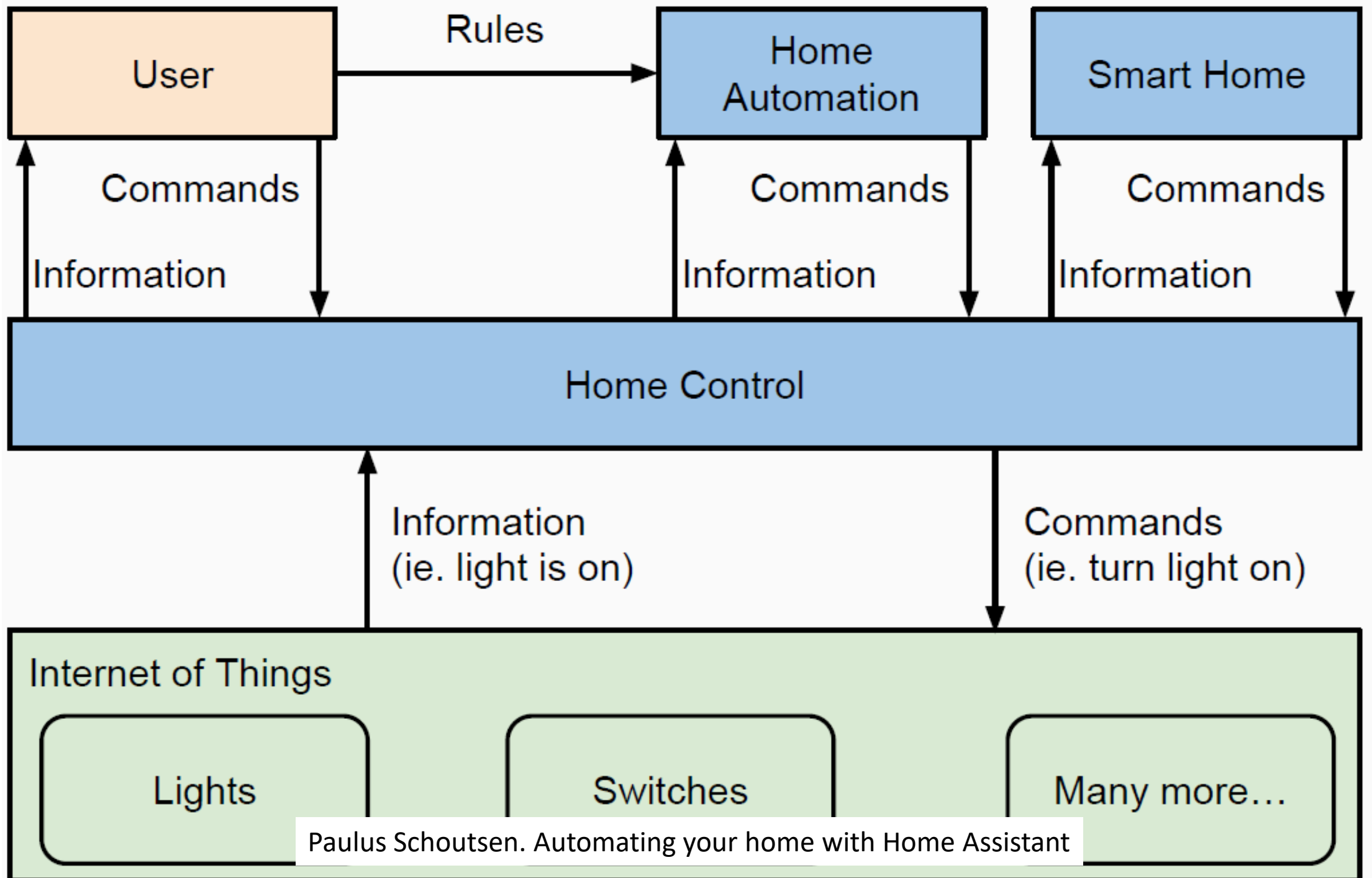


- Dispositivos têm um estado:
  - Light = on
    - Brightness: 120
    - Color: red
  - Media player = playing
    - Volume: 8
    - TV Show: Game of Thrones
- Há muitos eventos acontecendo:
  - Mudança de estado da luz
  - Detecção de movimento

# Automação Residencial



- Baseado em regras.
- Acionado por um evento.
- Condições opcionais baseadas no estado atual dos dispositivos.
- A ação pode ser controlar um dispositivo ou chamar um serviço externo.



# Smart Things

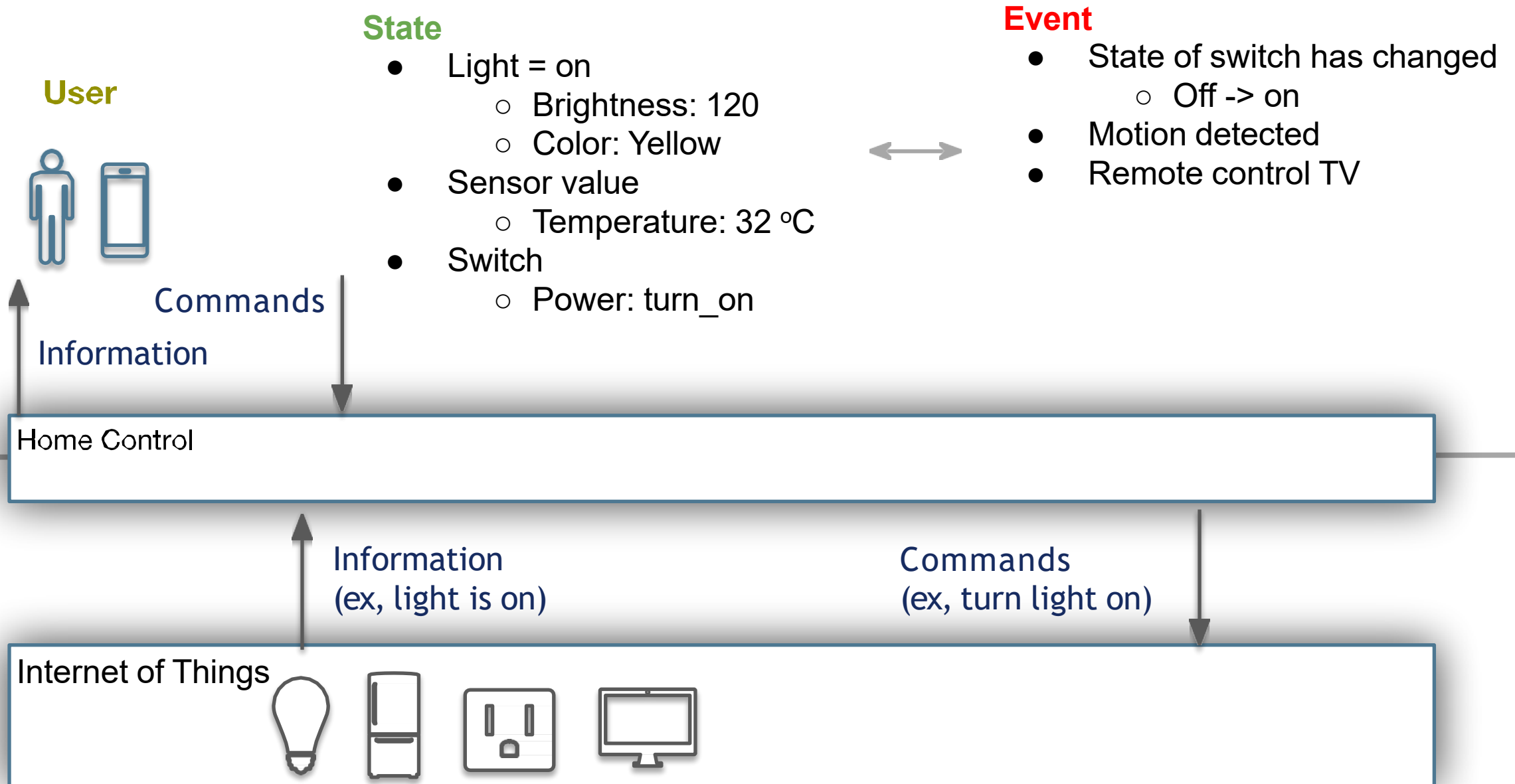
communicate with each other

at home

home control → home automation → smart home

location and time-based events

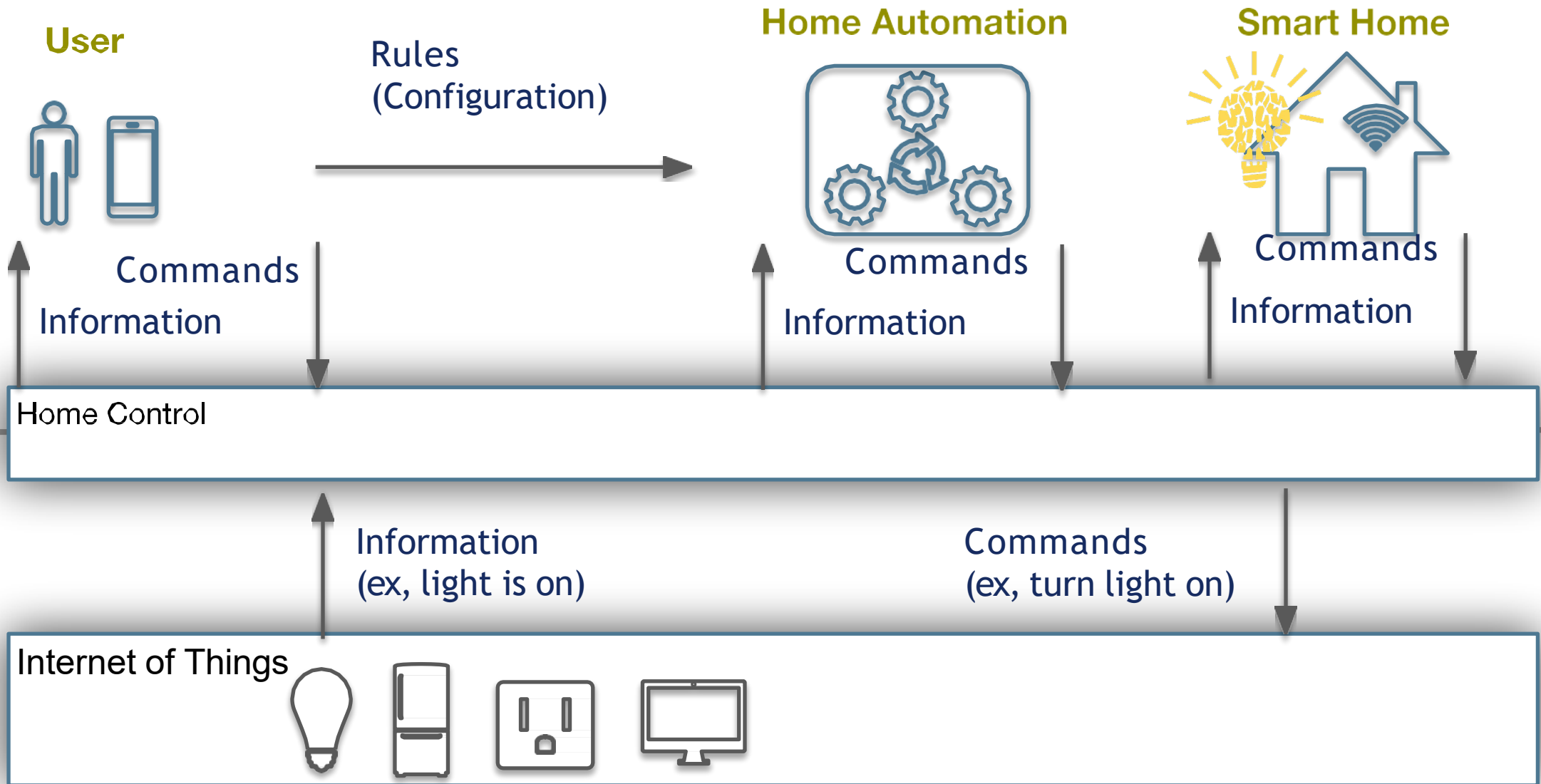
# Home Automation: Start from a hub





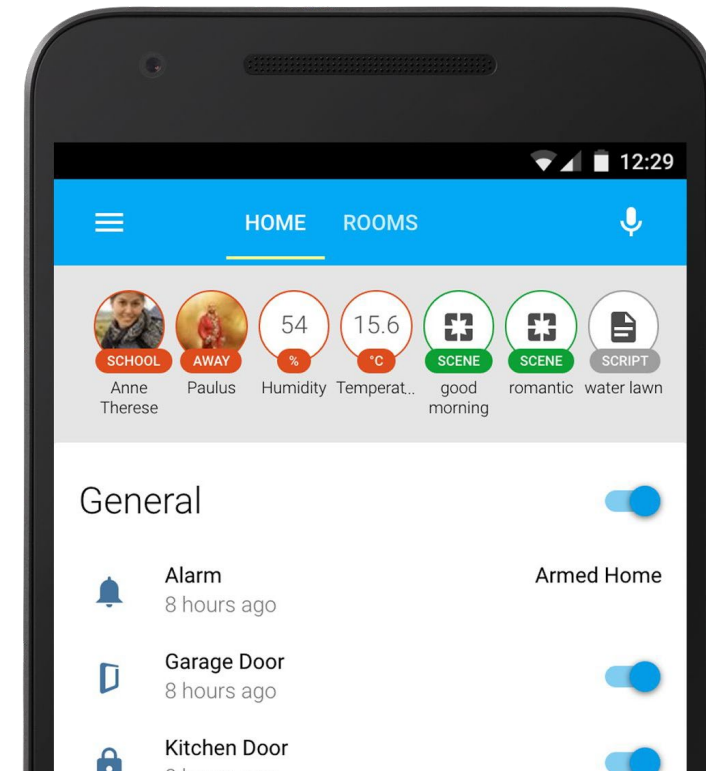
# Home Automation Landscape

Home Control, Automation & the Smart Home



# Home Assistant

- Plataforma de automação residencial rodando em Python 3.
- Hospede você mesmo para que seus dados permaneçam seus.
- Aplicativo web responsivo
- Acompanhe o estado da sua casa ao longo do tempo.
- Código aberto, licença MIT.



# Vocabulário no HA

- **Platforms**

- Types of devices (ex, lights, sensors)

- **Components (> 1000)**

- **Interact with an Internet-of-Things domain**

- MQTT, Zwave, Zigbee
- Lights (Hue, Tradfri)
- Sensors

- **Respond to events that happen within Home Assistant**

- Small pieces of home automation logic or involve services that do common tasks within your house.
- ex, [device\\_sun\\_light\\_trigger component](#)

## **Event Bus:**

facilitates the firing and listening of events  
-- the beating heart of Home Assistant.

## **State Machine:**

keeps track of the states of things and fires a `state_changed` event when a state has been changed.

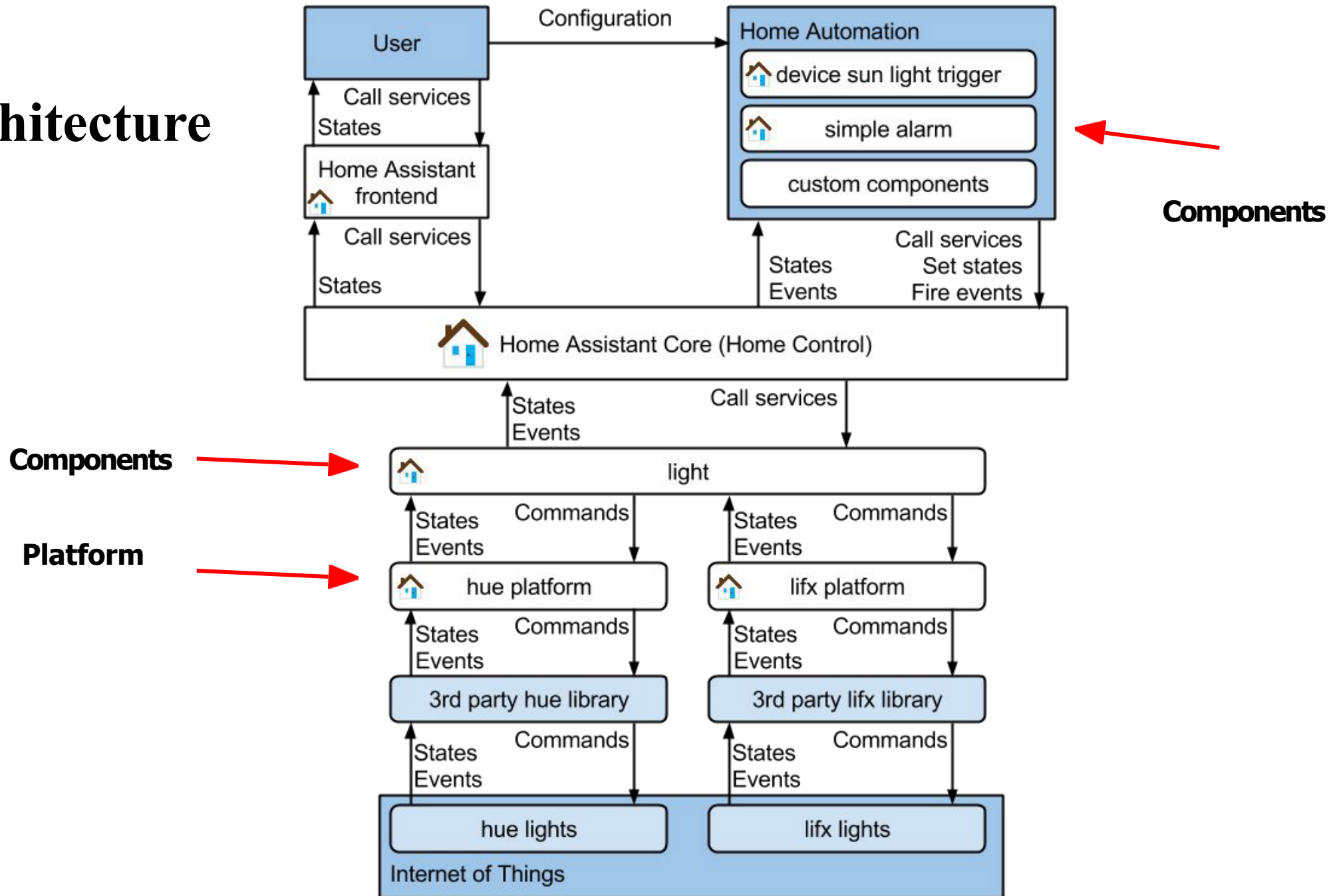
## **Service Registry:**

listens on the event bus for `call_service` events and allows other code to register services.

## **Timer:**

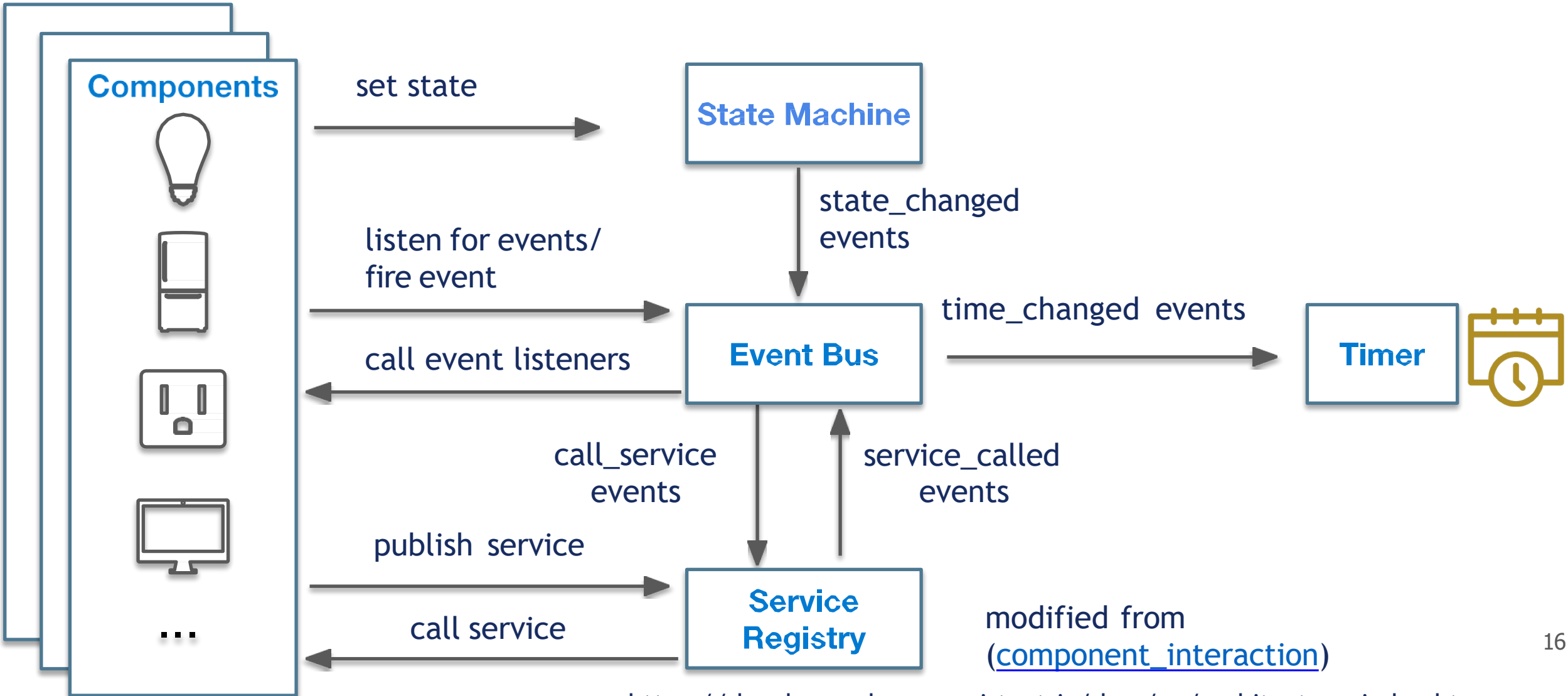
sends a `time_changed` event every 1 second on the event bus

# Architecture






















= part of the Home Assistant code base.

# Components Architecture



# Componentes

- Device Types (light, switch, etc)
- Presence Detection
- Entity Organization
- Automation
- Record History
- Third-Party Services Integrations
- Export Data
- Etc.

 Alexa / Amazon Echo Voice	 Arduino DIY	 Bitcoin Sensor	 Forecast.io Weather
 Google Cast Media Player	 Honeywell Thermostat Thermostat	 IFTTT Automation	 InfluxDB History
 Kodi Media Player	 MQTT Hub	 MySensors Hub	 Nest Hub
 Nmap Presence Detection	 Owntracks Presence Detection	 Philips Hue Light	 Plex Media Player
 PushBullet Notifications	 Sonos Media Player	 Wink Hub	

# // Components

## Note

Support for these components is provided by the Home Assistant community.

All (1082)

Featured

Added in 0.70 (5)

Added in 0.69 (5)

Added in 0.68 (15)

Alarm (22)

Automation (20)

Binary Sensor (75)













Calendar (6)

Camera (34)

Climate (34)

Cover (25)

DIY (17)

 Alexa / Amazon Echo voice	 Arduino diy	 Belkin WeMo hub	 Dark Sky weather
 ecobee hub	 Google Assistant voice	 Google Cast media-player	 IFTTT automation
 IKEA Trådfri (Tradfri)	 Kodi	 MQTT	 MySensors

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

# // Components

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All (1082)

xiaomi

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Binary Sensor (75)

Calendar (6)

Camera (34)

Climate (34)

Cover (25)

DIY (17)

Downloading (9)

Energy (12)

















Fan (13)

Finance (13)

Front end (5)

Health (7)

History (15)

 Xiaomi Air Purifier fan	 Xiaomi Air Quality Monitor sensor	 Xiaomi Binary Sensor binary-sensor	 Xiaomi BLE Temperature and Humidity sensor hub
 Xiaomi Cover cover	 Xiaomi Gateway (Aqara) hub	 Xiaomi IR Remote remote	 Xiaomi Light light
 Xiaomi Mi Robot Vacuum vacuum	 Xiaomi Mi WiFi Repeater 2 presence-detection	 Xiaomi Philips Light light	 Xiaomi Router presence-detection
 Xiaomi Sensor sensor	 Xiaomi Smart WiFi Socket and Smart Power Strip power	 Xiaomi Switch switch	 Xiaomi TV media-player



[https://www.home-assistant.io/components/xiaomi\\_aqara/](https://www.home-assistant.io/components/xiaomi_aqara/)



# Entity

switch components

Switch entity that keeps track of their state in memory

```
from homeassistant.components.switch import SwitchDevice

class MySwitch(SwitchDevice):

    def __init__(self):
        self._is_on = False

    @property
    def name(self):
        """Name of the device."""
        return 'My Switch'

    @property
    def is_on(self):
        """If the switch is currently on or off."""
        return self._is_on

    def turn_on(self, **kwargs):
        """Turn the switch on."""
        self._is_on = True

    def turn_off(self, **kwargs):
        """Turn the switch off."""
        self._is_on = False
```

# Automation

Check sensor value and (>10) show notification

```
automation:  
- alias: Check sensor value and show notification  
  trigger:  
    platform: numeric_state  
    entity_id: sensor.random_sensor  
    above: 10  
  action:  
    service: persistent_notification.create  
    data:  
      message: "Sensor value greater than 10"
```

```
automation: !include automations.yaml
```



Turn on the lights when the sun sets

```
# Example configuration.yaml entry  
group:  
  living_room:  
    - light.table_lamp  
    - light.ceiling  
  
automation:  
  alias: Turn on the light when the sun sets  
  trigger:  
    platform: sun  
    event: sunset  
    offset: "-01:00:00"  
  condition:  
    condition: state  
    entity_id: group.all_devices  
    state: 'home'  
  action:  
    service: light.turn_on  
    entity_id: group.living_room
```



States

Map

Logbook

History

Log Out

Streaming updates

Developer Tools



HOME ROOMS

Anne  
Therese

Paulus

Humidity  
Temperat...

## Welcome Home!

To install Home Assistant, run:

```
pip3 install homeassistant  
hass --open-ui
```

Here are some resources to get started.

- [Home Assistant website](#)
- [Installation instructions](#)
- [Troubleshooting your installation](#)
- [Configuring Home Assistant](#)
- [Available components](#)
- [Troubleshooting your configuration](#)
- [Ask community for help](#)

## Script

Water Lawn

ACTIVATE

## Scene

Romantic

ACTIVATE

## Configurator

Philips Hue

CONFIGURE

## Rooms

Living Room

Bedroom

## General

Alarm

armed home

Garage Door

Kitchen Door

Nest

21 °C  
Currently: 18 °C

## Cooking

 cook today  
Paulus

Notify Cook

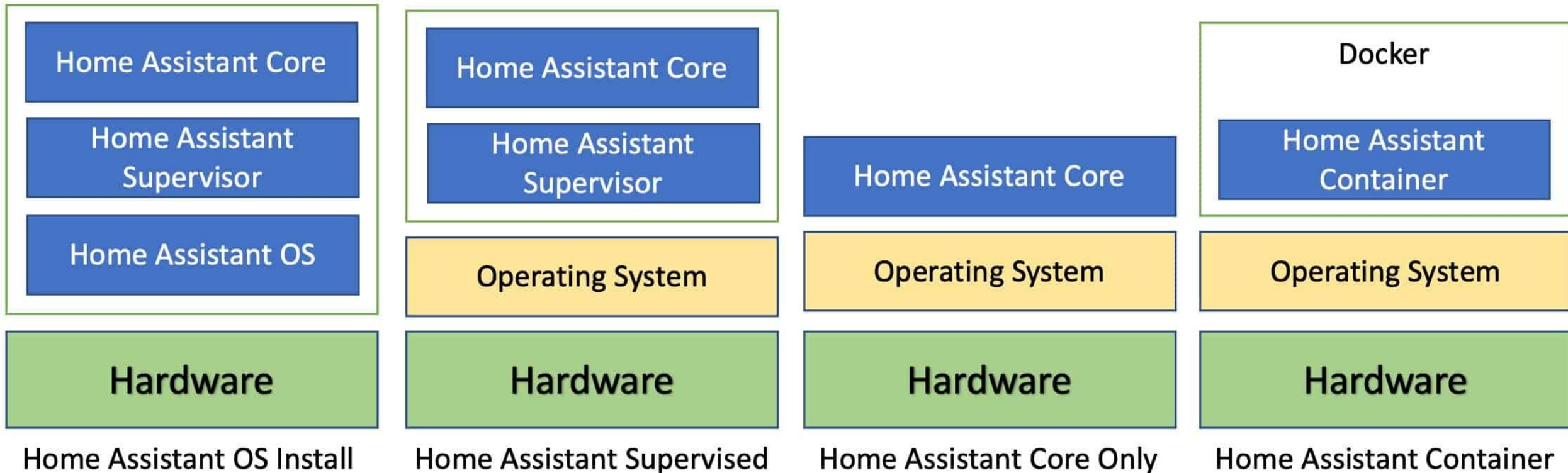


Living Room

INSTALAÇÃO

# FORMAS DE INSTALAÇÃO

- RASPBERRY PI
- DESKTOP



# VIRTUALBOX

- HABILITAR A VIRTUALIZAÇÃO NO BIO
- INSTALAR O VIRTUALBOX
- FAZER DOWNLOAD DO HOMEASSISTANT PARA VIRTUALBOX
- CRIAR E CONFIGURAR UMA MÁQUINA VIRTUAL PARA O HOMEASSISTANT
  - 2 NÚCLEOS
  - 2048 GYTES RAM
  - DISCO VDI DO HOME ASSISTANT COM 32 GBYTES
  - REDE BRIDGE

# INICIALIZAÇÃO

- HABILITAR A MÁQUINA VIRTUAL
- ANOTAR O ENDEREÇO IP DO HAOS
- ACESSAR O HOMEASSISTANT PELO BROWSER
  - HTTPS://<IP>:8123
- CRIAR UMA CONTA
- ENTRAR NO HOME ASSISTANT
- CRIAR UM DASHBOARD E ADQUIRIR POSSE
- CONFIGURAR O DISPOSITIVO ESPHOME

# CONFIGURAÇÃO DO DISPOSITIVO ESPHOME

- CRIAR UM DASHBOARD TENDO O DISPOSITIVO ESPHOME COM:
  - CHAVE DE HABILITAÇÃO DO DISPOSITIVO
  - SENSOR DE TEMPERATURA
  - SENSOR DE HUMIDADE



BOM TRABALHO

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