Home Assistant Dialogue

W3C TPAC 2023 Breakout Session

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Before we start!

- This sessions is part of W3C TPAC 2023
- These meetings follow the *Positive Work Environment at W3C: Code of Ethics and Professional Conduct* to ensure a healthy environment. Read more here.
- We follow COVID regulations set by the organizers. More in the next slide or here.
- Automatic Captions should be enabled

Health rules reminder

- Take a covid test each day before attending any in-person event
- Do not come to the meeting if your test is positive
- Masks must be worn at all times in all common spaces and meeting rooms
- Masks must cover the nose and mouth
- Masks can be removed only as necessary to consume food and beverages (Food forbidden in meeting rooms and only allowed in the dedicated space)
- Masks must be absolutely worn while speaking

Find all the rules at: www.w3.org/2023/09/TPAC/health

Agenda

- Logistics
- Goal
- Short Intro to WoT
- Short Intro to Home Assistant
  - Example HA/ESPhome Device
  - Home Assistant Dashboard
- Previous Experience
- Discussion
  - Integration Scenarios
  - Outreach
- Q&A

Logistics

Who can scribe?

Please join IRC and then type present+
https://irc.w3.org/?channels=%23wot-home-assistant

Use q+ when you want to speak

The minutes will be public

Event Details:
https://www.w3.org/events/meetings/c13a3ae8-979c-4157-9c74-b28aba314878/

Introduce Yourself

After talking, please put your name in IRC, together with your affiliation

Goal

Discuss how WoT can work with Home Assistant (and similar) smart home gateways/ecosystems

Short Introduction to Web of Things

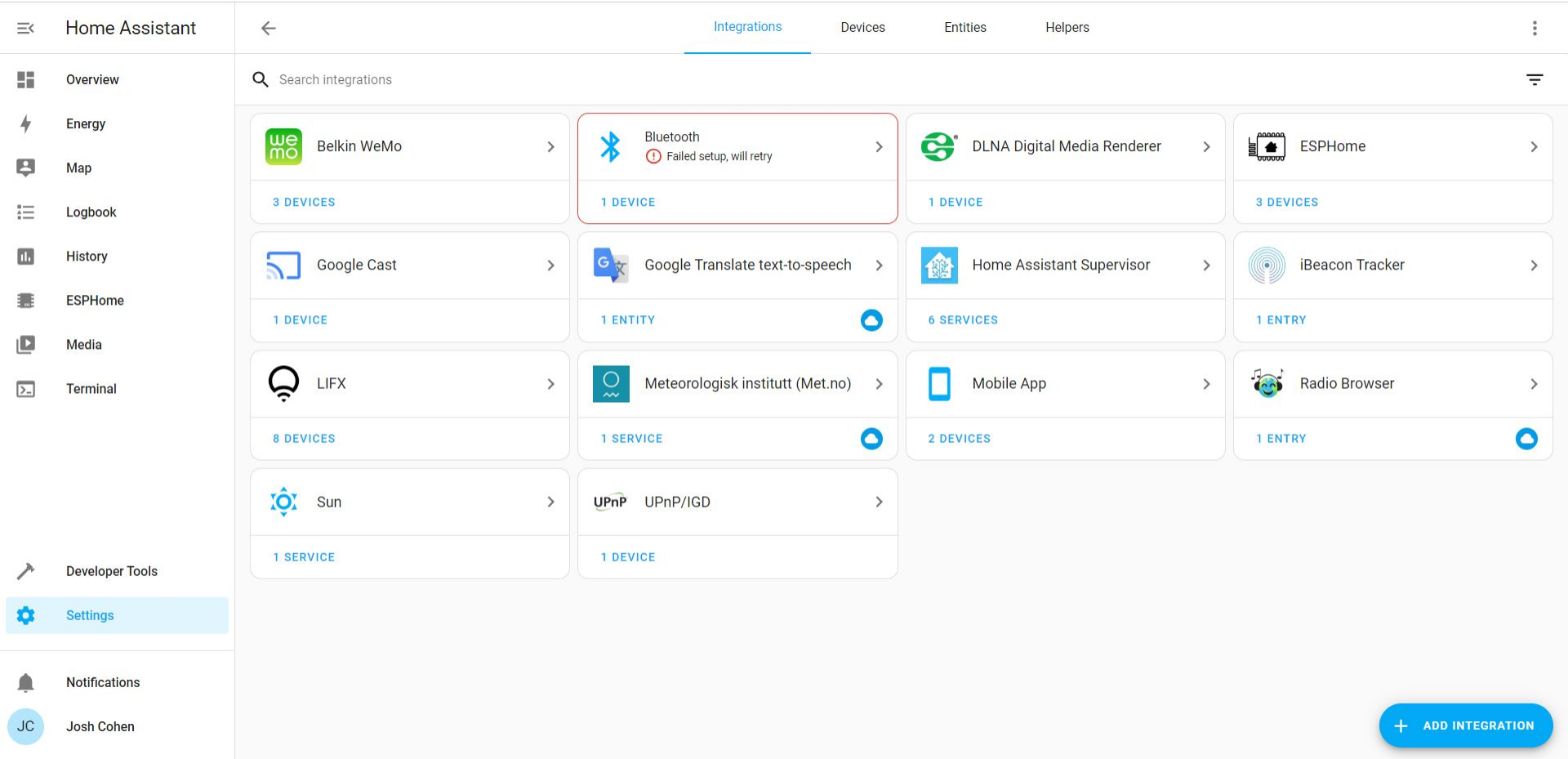
Short Introduction to Home Assistant

What is “Home Assistant”

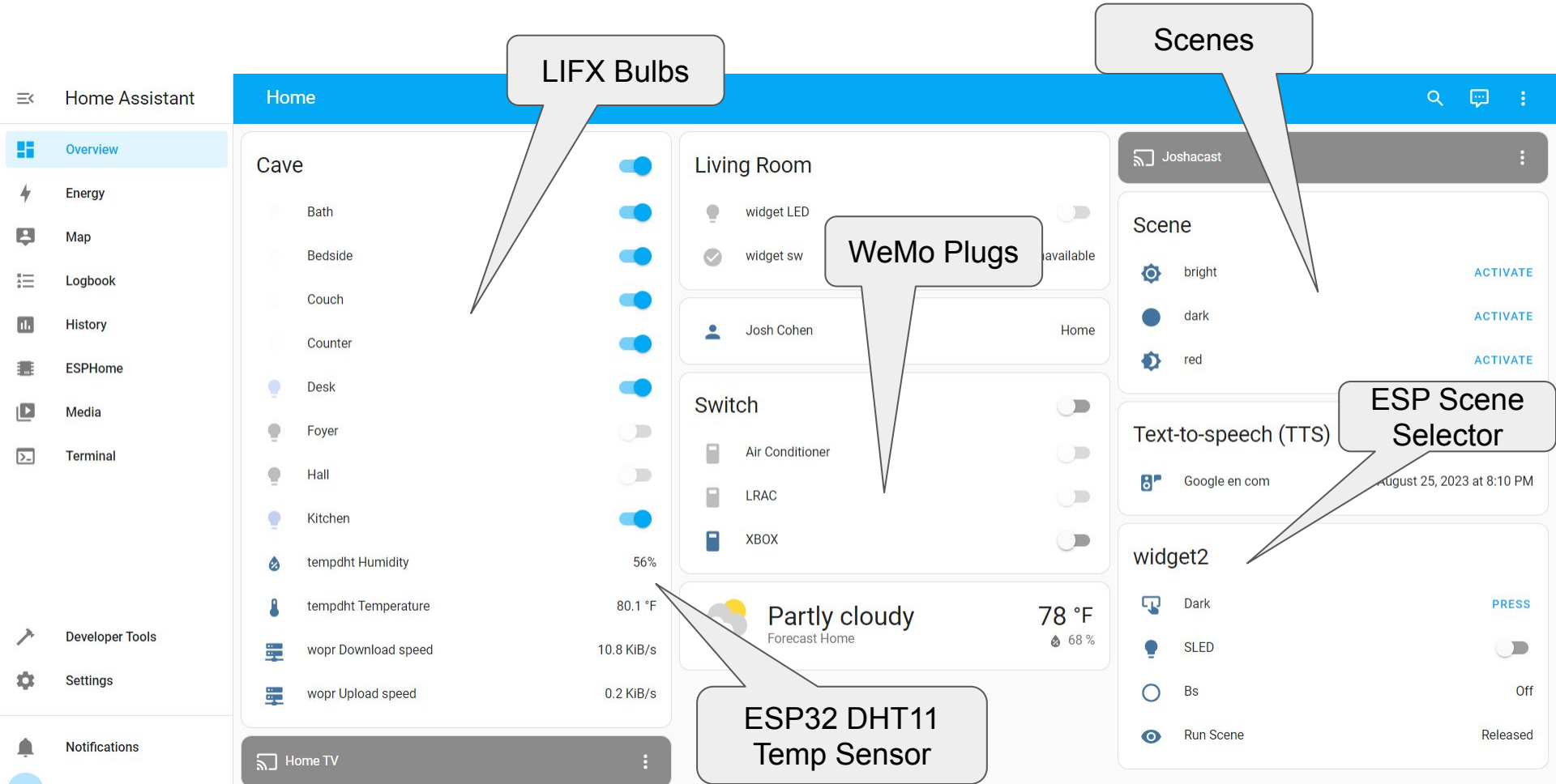
- An open source smart home gateway solution with almost 2000 integrations for different ecosystems and protocols.
- 5 years old next Sunday 
- https://www.home-assistant.io/
- It has a REST API (https://developers.home-assistant.io/docs/api/rest/)
- Installs on Windows, Linux, SBC, container or bare metal
- Auto Discovers many vendor products

- ESPHome Integration for ESP32/ESP8266 Microcontrollers
- Good solution for DIY. ESPs are used in Arduino IDE, platformio, VsCode etc
- Low Code YAML definitions or C API

Home Assistant Integrations



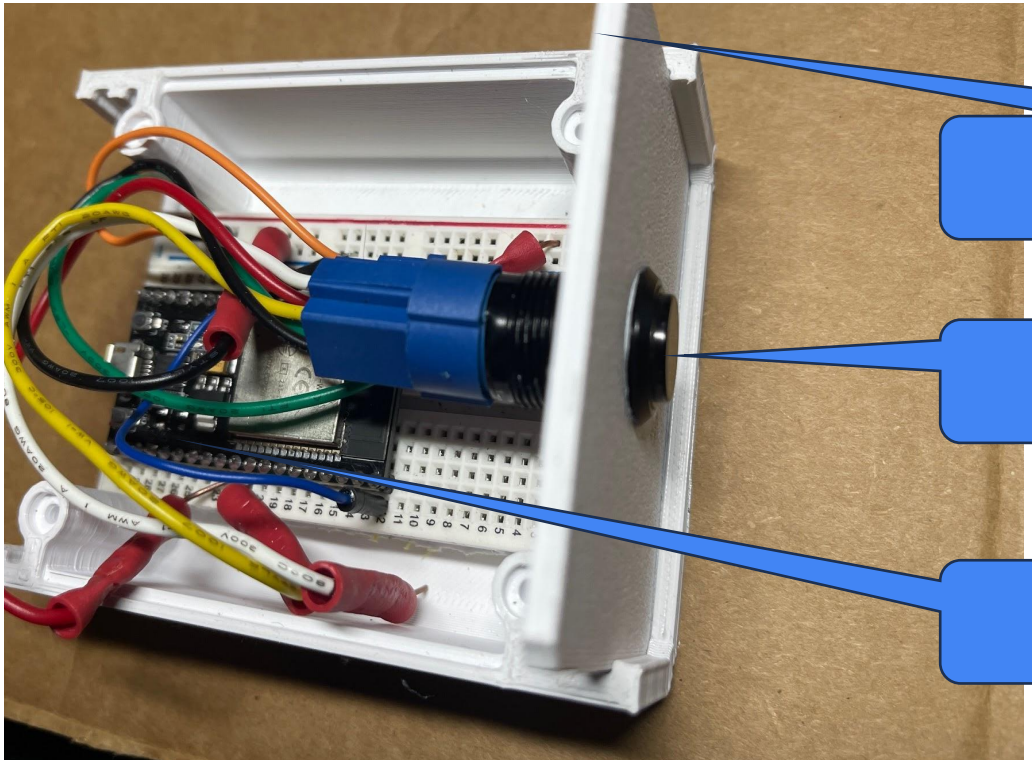
Home Assistant Dashboard



Example
DIY ESPHome Scene Selector

Build: HA/ESPhome Scene Button
ID: widget2

Ready for Bed: Short press = RED scene
Ready to Sleep: Long Press =LIGHTS OUT

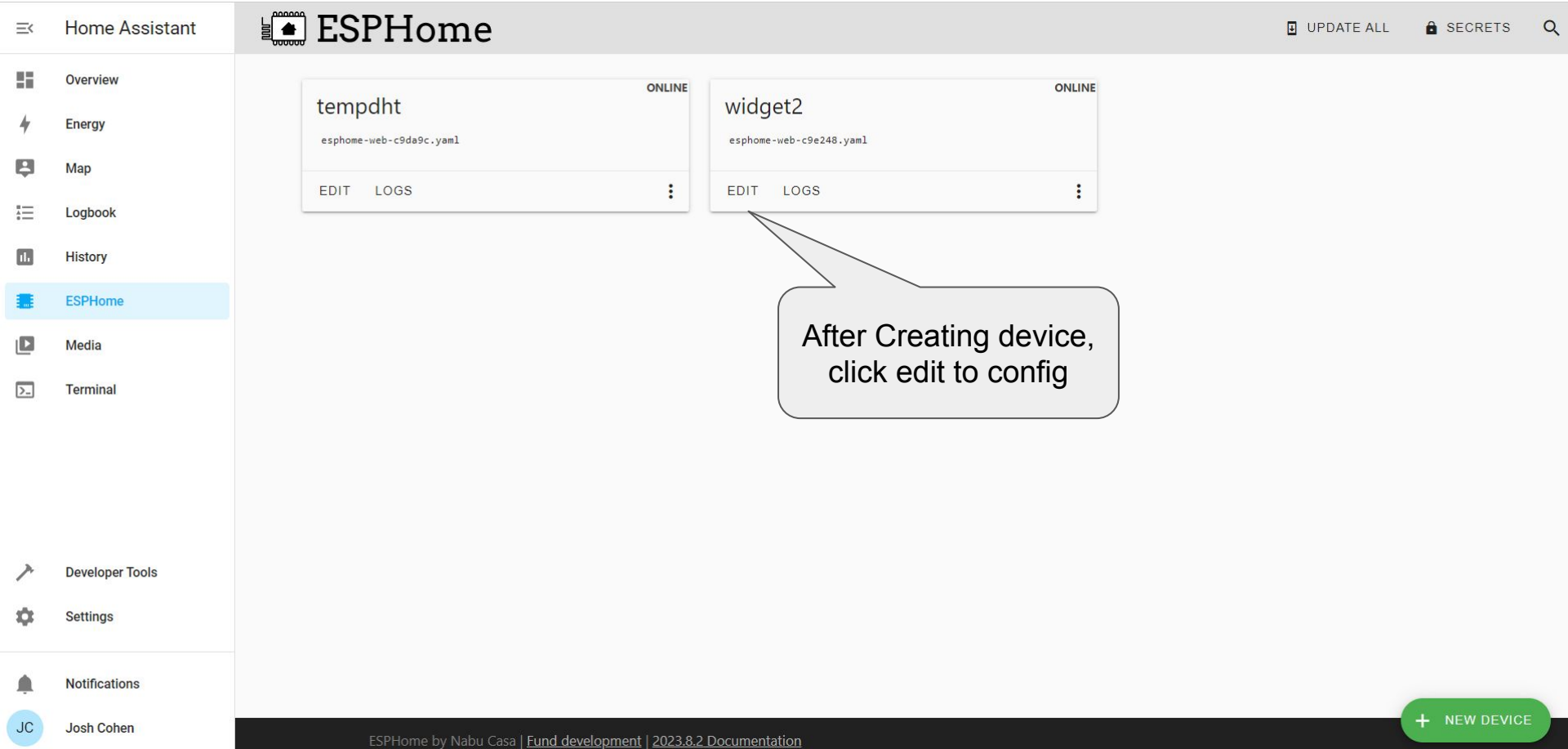


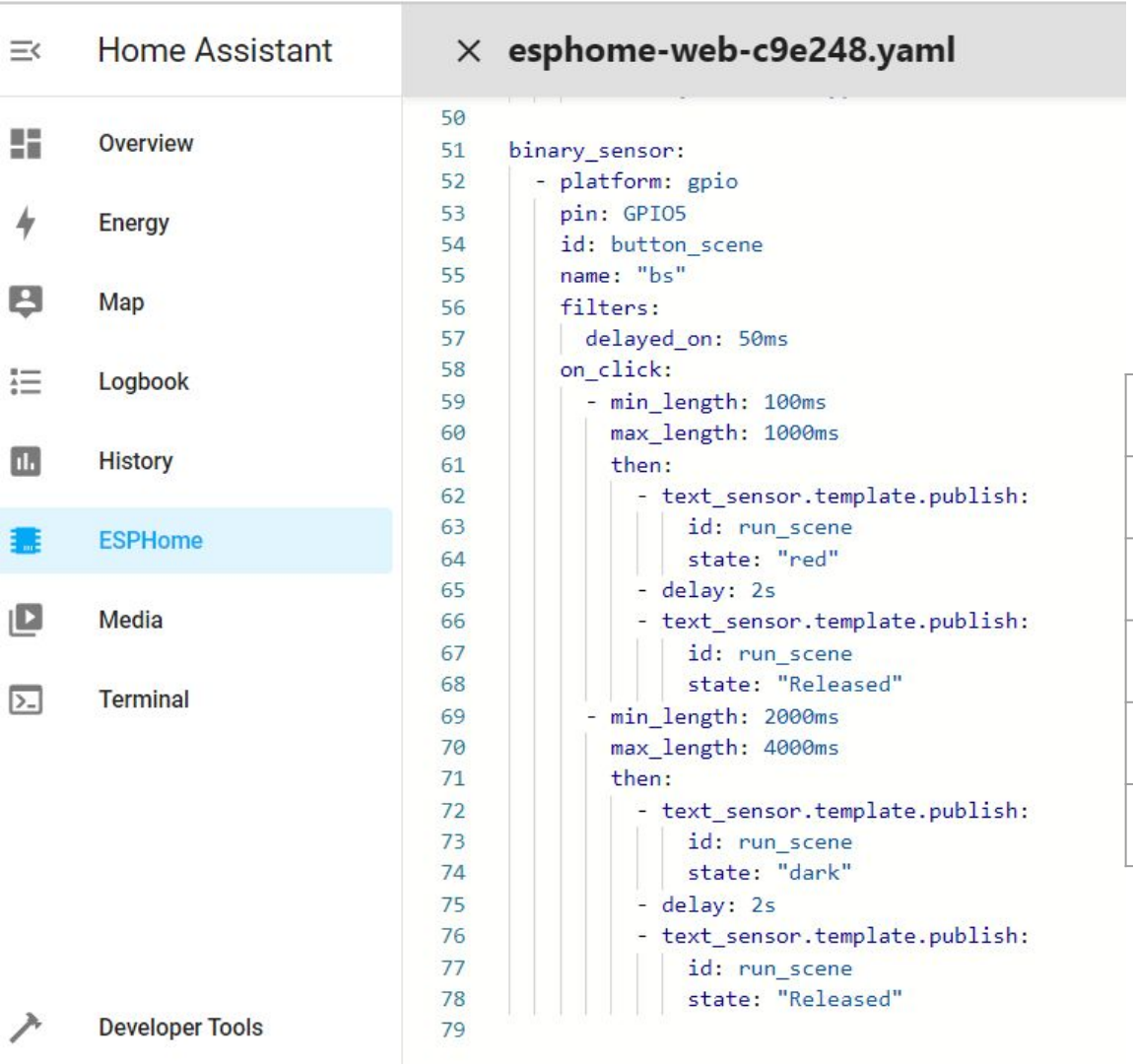
3D Printed Case

Binary Sensor: Push button

ESP32 Microcontroller

Home Assistant ESPHome Panel





WEB OF THINGS

Line	Comment
53	Switch on MCU GPIO Pin 5
57	Debounce!
58	On_click handler
59-68	Short press
69-78	Long Press

Previous Relevant Experience

TDs for Northbound REST API of Home Assistant

- Experiments from Michael McCool (Intel)
  - https://github.com/w3c/wot-testing/tree/main/data/input_2022/TD/intel-wot-ha
    - We will go into the details later
  - https://github.com/w3c/wot/blob/main/PRESENTATIONS/2022-05-WoT-Conexxus-McCool.pdf

Integration Scenarios

Integration not

A full rewrite of the architecture is pretty unlikely, no matter how amazing WoT is or can be. What can be easy paths forward for such platforms in general? What can be our strategy?

List of Scenarios

1. Southbound/HA Backend/Integration
    a. Self describing
    b. Externally describing
2. Northbound TDs for the REST API of HA (Add-on as by HA terminology)
3. ESP Home Integration

Integration Scenarios

WEB OF THINGS

W3C WoT

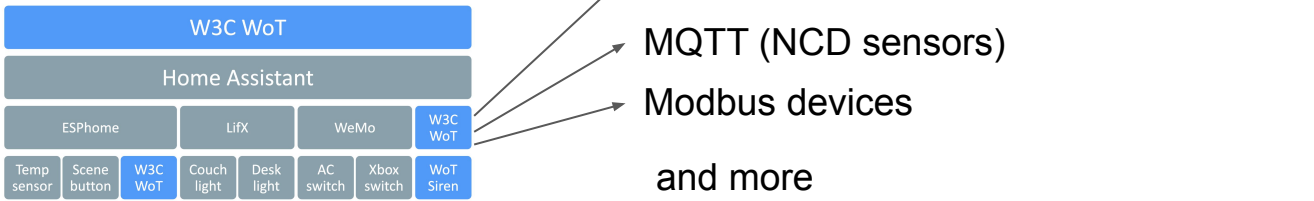
Home Assistant

ESPhome | LifX | WeMo | W3C WoT

Temp sensor | Scene button | W3C WoT | Couch light | Desk light | AC switch | Xbox switch | WoT Siren

Southbound Integration

WoT works well for cases where there is manual configuration overhead due to lack of standardized data model



Different Ways of Southbound

1. IoT devices come with TDs, i.e. self-describe
    a. In the future: Commercial devices expose a TD after onboarding
    b. DIY/Maker Space where makers build and program Things that expose TDs

This can also support directories and introduction mechanisms defined in WoT Discovery

2. External description of TDs
    a. Manually generate/write TDs
    b. Identify Thing from a set of TMs (catalogue), instantiate TD by filling the blanks/placeholders

Note: There are different levels of maturity for a HA integration

Annotating Events

ktk: Filtering based on events and annotating the events

Northbound Integration

McCool's work

We can generate TDs for the northbound REST API. This implies that TDs need to be to flexible enough to describe such APIs

https://github.com/w3c/wot-testing/blob/main/data/input_2022/TD/intel-wot-ha/TDs/sensor.ncd1_temperature_1.td.jsonld

Event Annotation

It can be done on top of the northbound integration where the annotated TDs can be consumed by a triple store

ESPHome Integration

ESPHome uses a YAML file to configure the device and this results in e.g. MQTT topics. We can predict those topics and generate a TD accordingly.

Once we generate those TDs, the southbound integration can happen

Business Case

For manufacturers

Instead of multiple integrations to different platforms, they need to write a TM themselves and the gateways consume them

What is Next?

To discuss offline

The discussion will continue in WoT CG meetings (office hours, internal meetings)

Please join or give us your contact information

Outreach

- Community developers, leaders, influencers
- YouTubers
- Home assistant founder
- Home assistant GitHub contributors
- GitHub issue
- Discord server

Any other inputs?

Meeting Minutes

https://www.w3.org/2023/09/13-wot-home-assistant-minutes.html

Participants Consolidation

Notes

Triplestore integration: https://www.youtube.com/watch?v=VqSf-z30x-M

“Web of Things is not a protocol” is not well understood. It is not a protocol, it is a data model

Use Cases document is not well advertised

Backup


Linkind
matter
works with Apple Home
works with alexa
works with Google Home
Works with SmartThings
Works with AiDot