

# Home Assistant Dialogue

W3C TPAC 2023 Breakout Session

Ege Korkan, Josh Cohen,  
Michael McCool, Cristiano Aguzzi

# 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](http://www.w3.org/2023/09/TPAC/health)*

Seville

11-15 September

TPAC  
2023

W3C®

# 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

Overview

Energy

Map

Logbook

History

ESPHome

Media

Terminal

Developer Tools

Settings

Notifications

JC Josh Cohen

Integrations

Devices

Entities

Helpers

Search Integrations

Belkin WeMo

3 DEVICES

Bluetooth

1 DEVICE

DLNA Digital Media Renderer

1 DEVICE

ESPHome

3 DEVICES

Google Cast

1 DEVICE

Google Translate text-to-speech

1 ENTITY

Home Assistant Supervisor

6 SERVICES

iBeacon Tracker

1 ENTRY

LIFX

8 DEVICES

Meteorologisk institutt (Met.no)

1 SERVICE

Mobile App

2 DEVICES

Radio Browser

1 ENTRY

Sun

1 SERVICE

UPnP IGDP

1 DEVICE

+

ADD INTEGRATION

# Home Assistant Dashboard

The screenshot shows the Home Assistant dashboard interface. The left sidebar contains navigation links: Overview (selected), Energy, Map, Logbook, History, ESPHome, Media, Terminal, Developer Tools, Settings, and Notifications. The main content area is titled 'Home' and is divided into several sections. The 'Cave' section lists various rooms and their status: Bath (on), Bedside (on), Couch (on), Counter (on), Desk (on), Foyer (off), Hall (off), Kitchen (on), tempdht Humidity (56%), tempdht Temperature (80.1 °F), wopr Download speed (10.8 KiB/s), and wopr Upload speed (0.2 KiB/s). The 'Living Room' section shows 'widget LED' (off) and 'widget sw' (on). The 'Switch' section shows 'Air Conditioner' (off), 'LRAC' (off), and 'XBOX' (off). The bottom section shows weather information: 'Partly cloudy' with a forecast from Home, a temperature of 78 °F, and a humidity of 68%. The right sidebar contains a 'Scenes' section with a 'Joshacast' card and a 'Scene' list: 'bright' (ACTIVE), 'dark' (ACTIVE), and 'red' (ACTIVE). Below this is a 'Text-to-speech (TTS)' section with a 'Google en com' card. The bottom right section is titled 'widget2' and contains a list of items: 'Dark' (PRESS), 'SLED' (off), 'Bs' (Off), and 'Run Scene' (Released). Callouts point to specific components: 'LIFX Bulbs' points to the 'Cave' section, 'WeMo Plugs' points to the 'Living Room' section, 'ESP32 DHT11 Temp Sensor' points to the 'tempdht Temperature' card, and 'ESP Scene Selector' points to the 'Scene' list.

Home Assistant

Home

Overview

Energy

Map

Logbook

History

ESPHome

Media

Terminal

Developer Tools

Settings

Notifications

Cave

Bath

Bedside

Couch

Counter

Desk

Foyer

Hall

Kitchen

tempdht Humidity

tempdht Temperature

wopr Download speed

wopr Upload speed

Living Room

widget LED

widget sw

Josh Cohen

Home

Switch

Air Conditioner

LRAC

XBOX

Partly cloudy

Forecast Home

78 °F

68 %

Scenes

Joshacast

Scene

bright

dark

red

Text-to-speech (TTS)

Google en com

August 25, 2023 at 8:10 PM

widget2

Dark

SLED

Bs

Run Scene

ESP32 DHT11 Temp Sensor

ESP Scene Selector

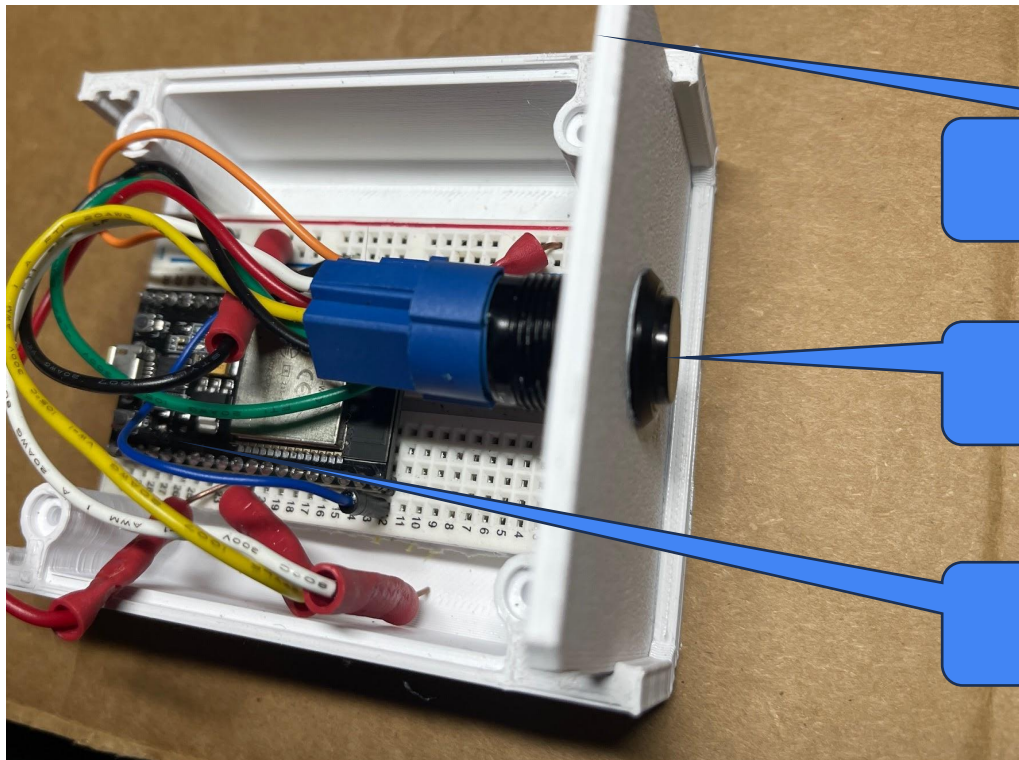
# Example

## 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

Home Assistant

Overview

Energy

Map

Logbook

History

ESPHome

Media

Terminal

Developer Tools

Settings

Notifications

JC

Josh Cohen

ESPHome

UPDATE ALL

SECRETS

tempdht

esphome-web-c9da9c.yaml

EDIT

LOGS

widget2

esphome-web-c9e248.yaml

EDIT

LOGS

After Creating device,  
click edit to config

+ NEW DEVICE

ESPHome by Nabu Casa | [Fund development](#) | [2023.8.2 Documentation](#)

Home Assistant

Overview

Energy

Map

Logbook

History

ESPHome

Media

Terminal

Developer Tools

×

esphome-web-c9e248.yaml

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

```
binary_sensor:
  - platform: gpio
    pin: GPIO5
    id: button_scene
    name: "bs"
    filters:
      delayed_on: 50ms
    on_click:
      - min_length: 100ms
        max_length: 1000ms
        then:
          - text_sensor.template.publish:
              id: run_scene
              state: "red"
          - delay: 2s
          - text_sensor.template.publish:
              id: run_scene
              state: "Released"
      - min_length: 2000ms
        max_length: 4000ms
        then:
          - text_sensor.template.publish:
              id: run_scene
              state: "dark"
          - delay: 2s
          - text_sensor.template.publish:
              id: run_scene
              state: "Released"
```

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](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

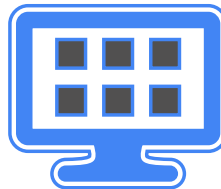
A full rewrite of the architecture is pretty unlikely, no matter how amazing WoT is or can be. What can be easy paths forward for such platforms in general? What can be our strategy?

# 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

WoT dashboard



W3C WoT

Home Assistant

ESPhome

LifX

WeMo

W3C  
WoT

Temp  
sensor

Scene  
button

W3C  
WoT

Couch  
light

Desk  
light

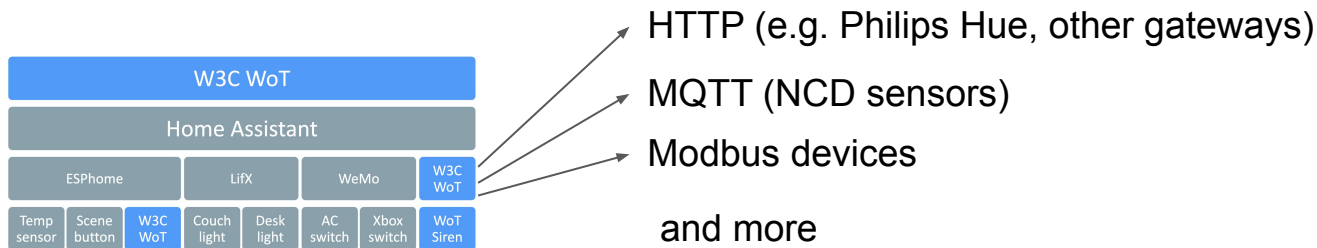
AC  
switch

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 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](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

