

W3C Web of Things Community Group

TPAC 2023 - Quick Intro to WoT

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September 11th and 14th, 2023

With a browser, you can
access all the content in
the Web

You don't have that with
IoT

WoT is here to fix it!

What is different in IoT?

- Not just HTTP, welcome CoAP, MQTT, Modbus, OPC UA, BACnet and more...
- Not just about a server serving data, there is influence of/on the real world
- Walled gardens
 - No interoperability across vendors
 - Dependency to SDKs

Overall, there is a fragmentation problem

A small part of the landscape



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OCF SOLVING THE IOT STANDARDS GAP

Open Connectivity Foundation: Unlocking the Massive Opportunity in the Internet of Things



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Joining OCF is easy

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Alliance for IoT
and Edge Computing
Innovation



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Mission Statement

OPC Foundation: The Industrial Interoperability Standard™



The Foundation for Connected Things

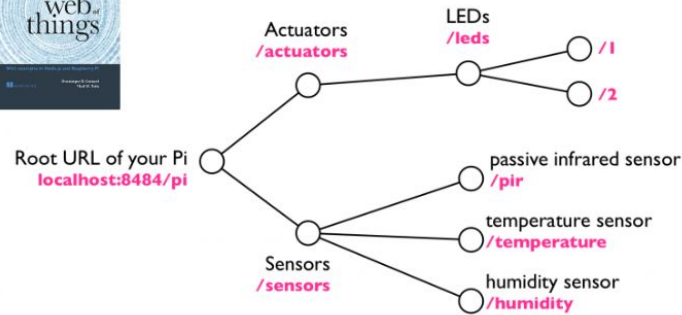
One protocol to connect compatible devices and systems with one another. Smart home devices should be secure, reliable, and seamless to use. And with Matter, they are.

Download Matter Specification



Each domain has its own
set of protocols,
standards, tools,
vocabularies

Web of Things Now



Source: Building the Web of Things: book.webofthings.io
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Was a proposal on how
to build REST APIs for IoT
devices



Is about describing *any*
kind of API for IoT devices
using *any* protocol

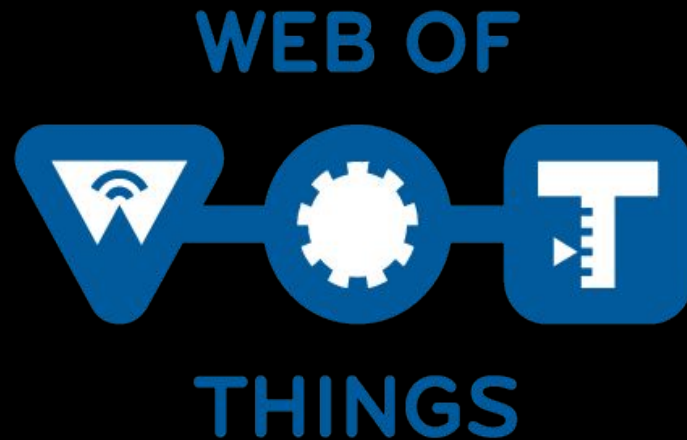
Now 4 normative
deliverables (from WG),
participants from over 35
organizations, dozens of
implementations



Family of W3C Standards

**(Re)Usable API Descriptions
for every *Thing***

Royalty Free and Open

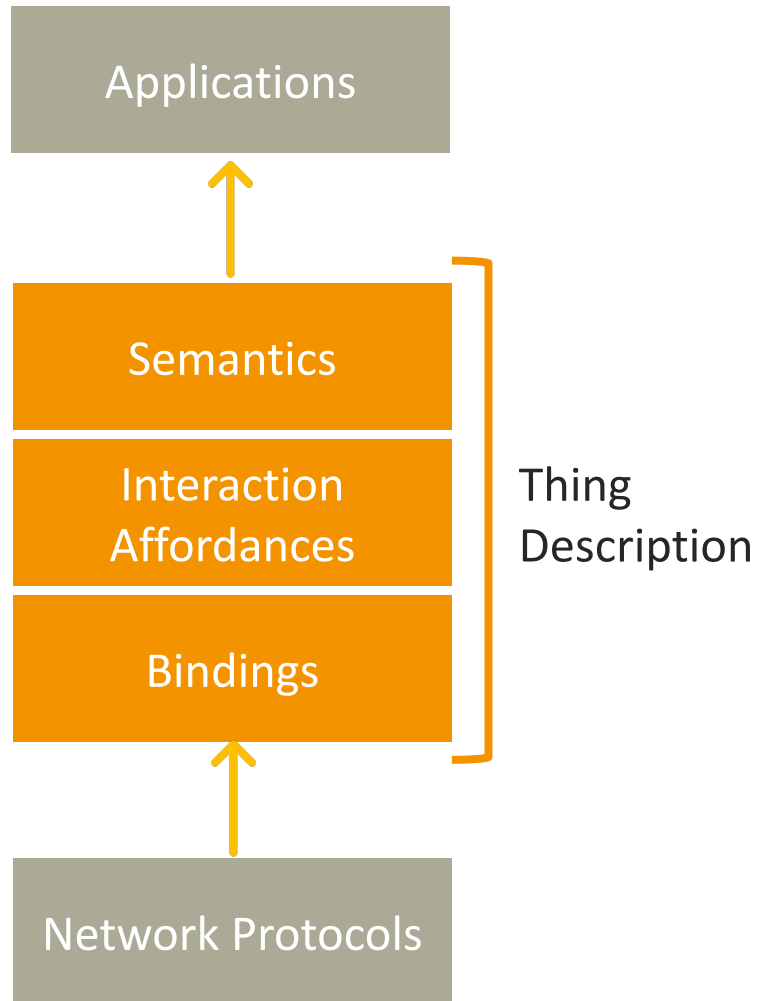


Open Source

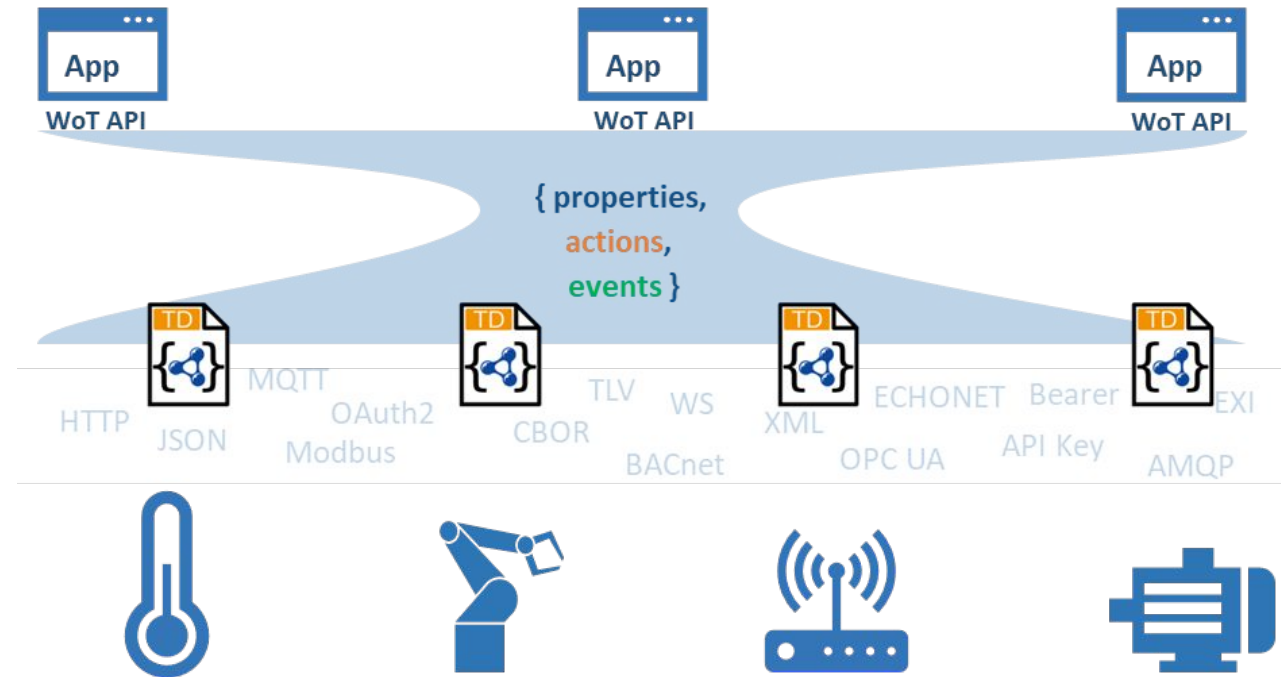
Developer Friendly

Market Adoption

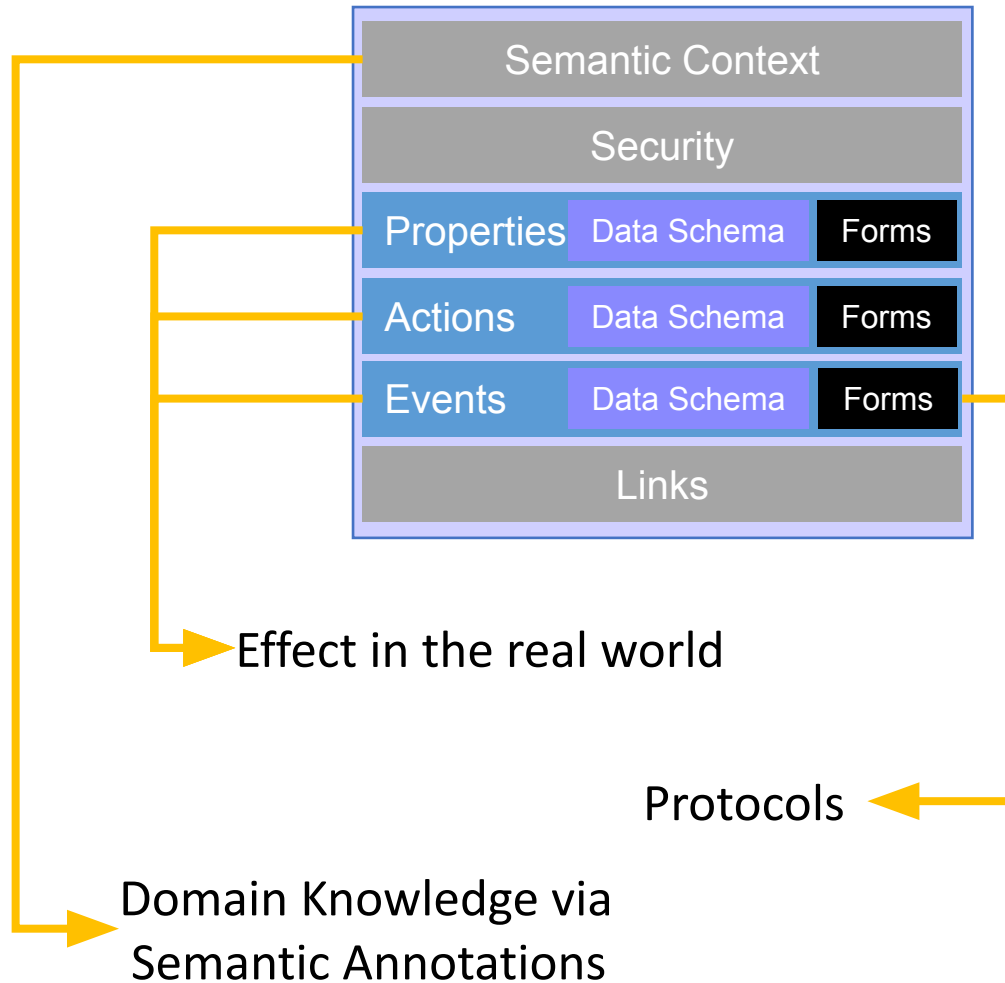
Web of Things, not a Protocol



Narrow Waist Model



Core Specification: Thing Description (TD)



```
{
  "@context": "https://www.w3.org/2019/wot/td/v1",
  "id": "urn:HotelRoom",
  "@type": "Thing",
  "base": "coap://localhost:3000",
  "title": "simulated Hotel Room",
  "properties": {
    "brightness": {
      "type": "integer",
      "title": "Light Brightness",
      "forms": [
        {
          "href": "/light/Brightness",
          "contentType": "application/cbor",
          "op": [
            "observeproperty",
            "readproperty",
            "writeproperty"
          ]
        }
      ]
    }
  }
},
```

JSON-LD Serialization



Discovery and
Usage by Clients

What to do with a TD

- Communicating with the Thing
- Device Proxying and Protocol Translation
- UI generation
- Device Management
- Business/Application Logic Composition (MAS and Mashups)

Quick Deeper look into the Thing Description



W3C Recommendation	TABLE OF CONTENTS
1.	Introduction
2.	Conformance
3.	Terminology
4.	Namespaces
5.	TD Information Model
5.1	Overview
5.2	Preliminaries
5.3	Class Definitions
5.3.1	Core Vocabulary Definitions
5.3.1.1	Thing
5.3.1.2	InteractionAffordance
5.3.1.3	PropertyAffordance
5.3.1.4	ActionAffordance
5.3.1.5	EventAffordance
5.3.1.6	VersionInfo
5.3.1.7	MultiLanguage
5.3.2	Data Schema Vocabulary Definitions
5.3.2.1	DataSchema
5.3.2.2	ArraySchema
5.3.2.3	BooleanSchema

Web of Things (WoT) Thing Description

W3C Recommendation 9 April 2020 (Link errors corrected 23 June 2020)

This version:

<https://www.w3.org/TR/2020/REC-wot-thing-description-20200409/>

Latest published version:

<https://www.w3.org/TR/wot-thing-description/>

Latest editor's draft:

<https://w3c.github.io/wot-thing-description/>

Implementation report:

<https://w3c.github.io/wot-thing-description/testing/report.html>

Previous version:

<https://www.w3.org/TR/2020/PR-wot-thing-description-20200130/>

Editors:

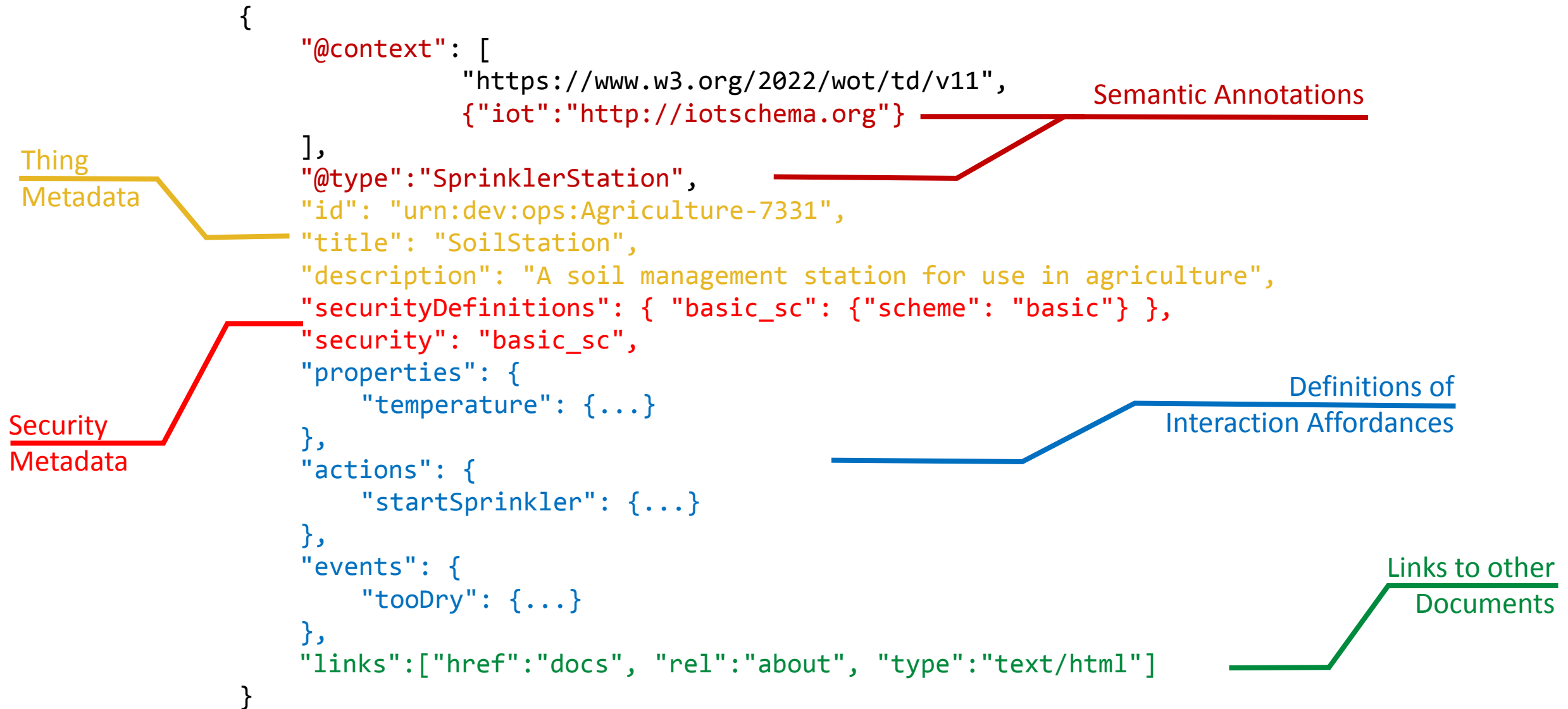
Sebastian Kaebisch ([Siemens AG](#))
Takuki Kamiya ([Fujitsu Laboratories of America](#))
Michael McCool ([Intel](#))
Victor Charpenay ([Siemens AG](#))
Matthias Kovatsch ([Huawei](#))

Participate:

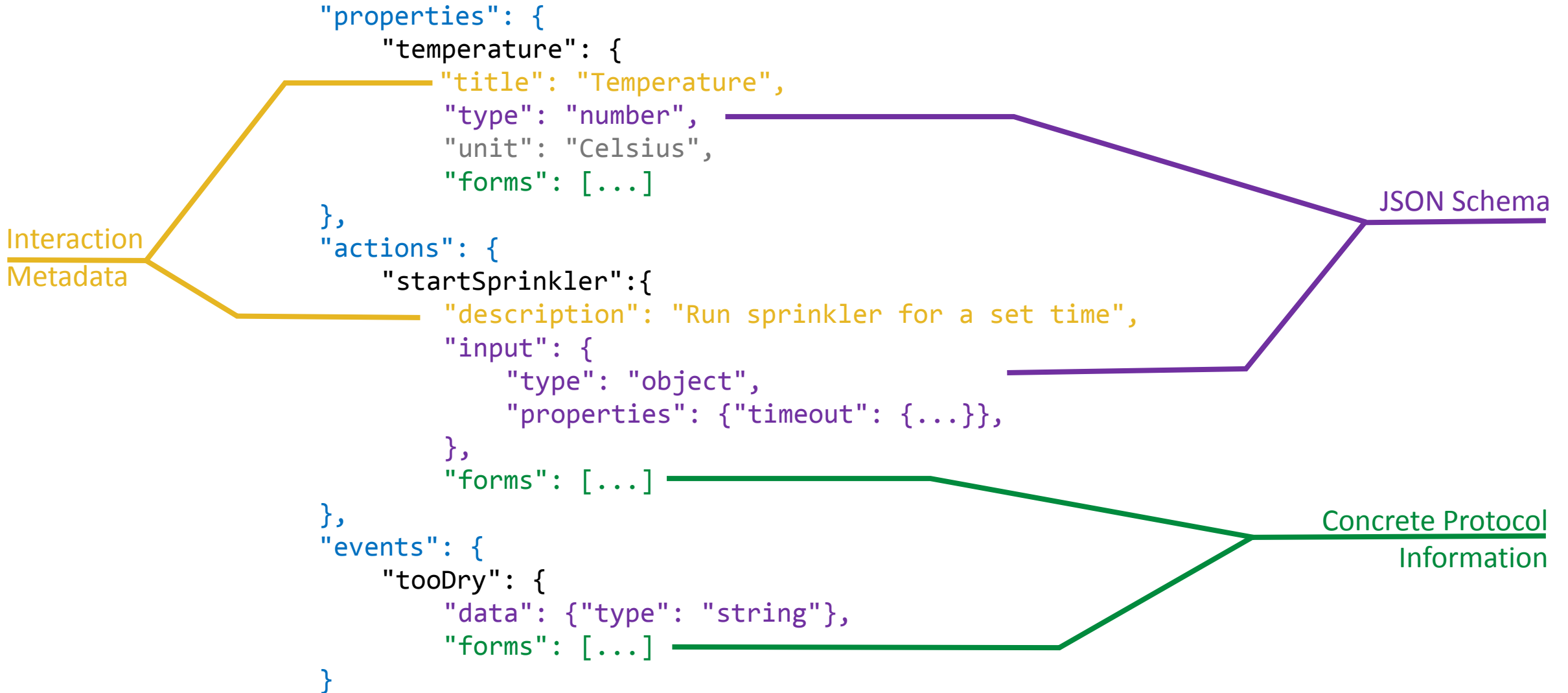
[GitHub w3c/wot-thing-description](#)

Version 1.1 almost out!

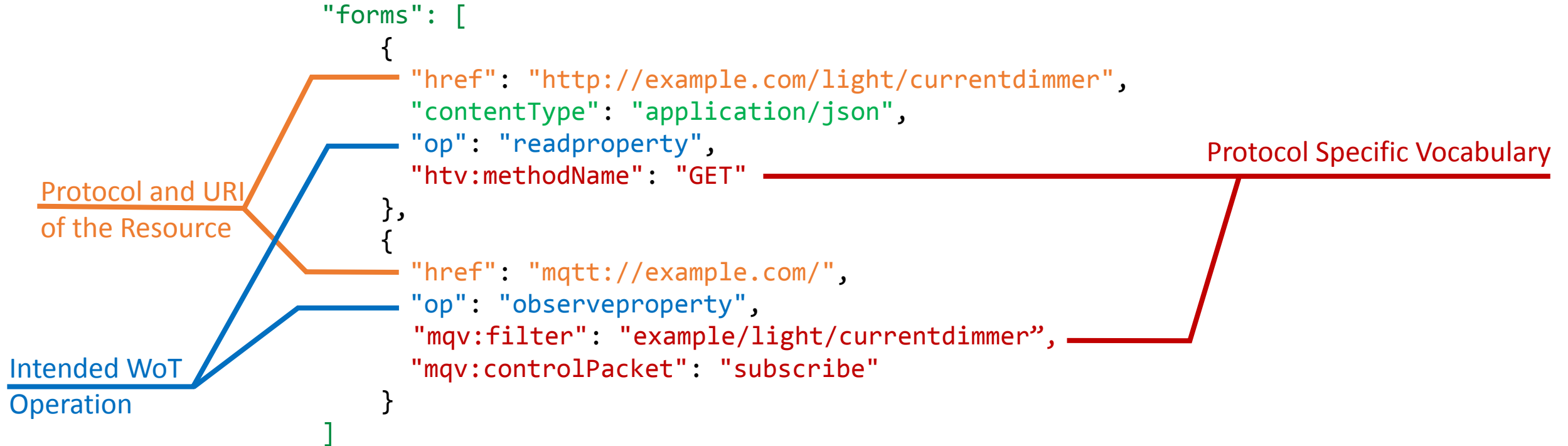
Deeper look: Thing Level



Deeper look: Interaction Level



Deeper look: Protocol Level



Other WoT Specifications

REC

Architecture

Common Reference, Deployment Patterns,
Relationship between specifications

REC

Discovery

How to find TDs in a network, TD management
via a REST API

REC*

Profile

A mechanism for creating subset of TD for less
flexibility but easier implementability

Binding Templates

Extending TDs for different protocols, media
types, ecosystems, etc.

Scripting API

Programming API for building Consumer and
Thing applications

Use Cases and Requirements

Where different WoT specifications get
motivation for new features

Where to Learn More?

Official Web Page of W3C WoT



The screenshot shows the W3C Web of Things website. At the top, there's a navigation bar with links: Groups, Activities, Developers, Documentation, Videos, and Contact. Below this, the main content area features a 'W3C Web of Things' section with a description of the project's goal to counter IoT fragmentation. To the right, there's a 'WoT Videos' section with a video player. Below the main text, there are six icons representing different areas: Working Group, Interest Group, Community Groups, Task Forces, Developers, and Documentation. On the right side, there's a 'Tweets by @W3C_WoT' section showing recent tweets. At the bottom, there's a footer with copyright information: © W3C · Privacy · Terms, MIT · ERCIM · Keio · Beihang.

<https://www.w3.org/WoT/>

[@W3C_WoT](https://twitter.com/W3C_WoT)

Try [node-wot](#) , [editDor](#) and [Playground](#)

Do [a simple tutorial](#)

Read documentation and watch some videos on the official page

Join one of the CG office hours

Stay in Touch with the CG

- Join our Discord: <https://discord.gg/RJNYJsEgnb>
- Open GitHub Issues or start GitHub Discussions at <https://github.com/w3c/wot-cg>
- Send Emails to public-web-of-things@w3.org
- All future events are visible in our calendar at <https://www.w3.org/groups/cg/wot/calendar>

WoT Related Events at TPAC

- JSON-LD, RDF* Joint Session today afternoon
- WoT WG/IG Meetings on Thursday and Friday
- WoT CG Meetings on Thursday and Friday (longer intro to WoT on Thursday)
- Breakout sessions on Wednesday that are relevant to WoT:
 - Home Assistant Dialogue:
<https://www.w3.org/2023/09/TPAC/breakouts.html#b-c13a3ae8-979c-4157-9c74-b28aba314878>
 - Schema Languages:
<https://www.w3.org/2023/09/TPAC/breakouts.html#b-b8617206-4c2b-4355-80da-fcf4eb628d1a>
 - Web-based Digital Twins for Smart Cities:
<https://www.w3.org/2023/09/TPAC/breakouts.html#b-36a66bc5-7515-41a1-b7a8-625d4dadb338>

WoT CG Calendar: <https://www.w3.org/groups/cg/wot/calendar/>

WoT WG Calendar: <https://www.w3.org/groups/wg/wot/calendar/>