



W3C Web of Things

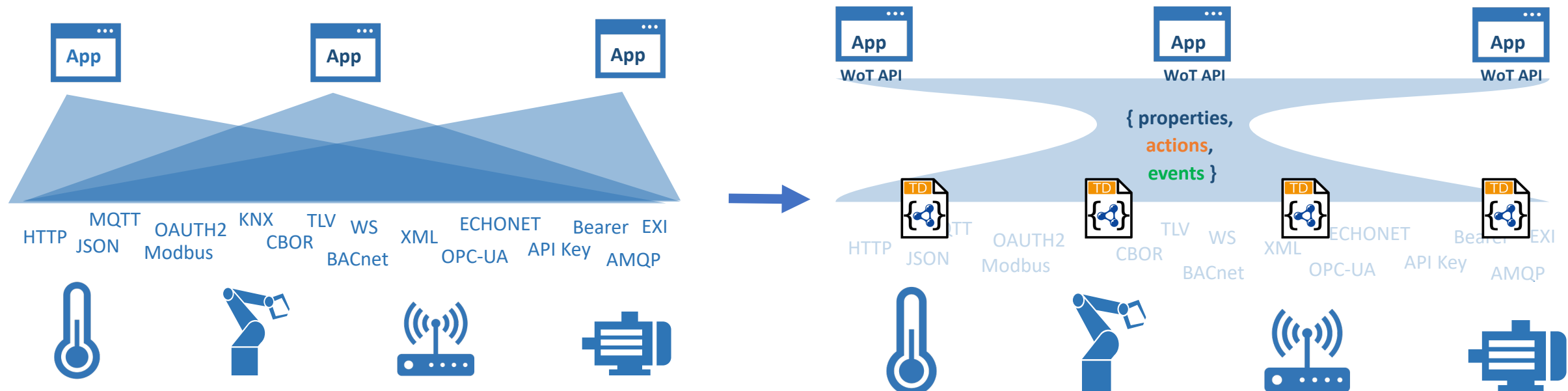
Talk for “Nordic Smart Cities/WoT CG”

Sebastian Kaebisch

27 November 2023

W3C Web of Things (WoT)

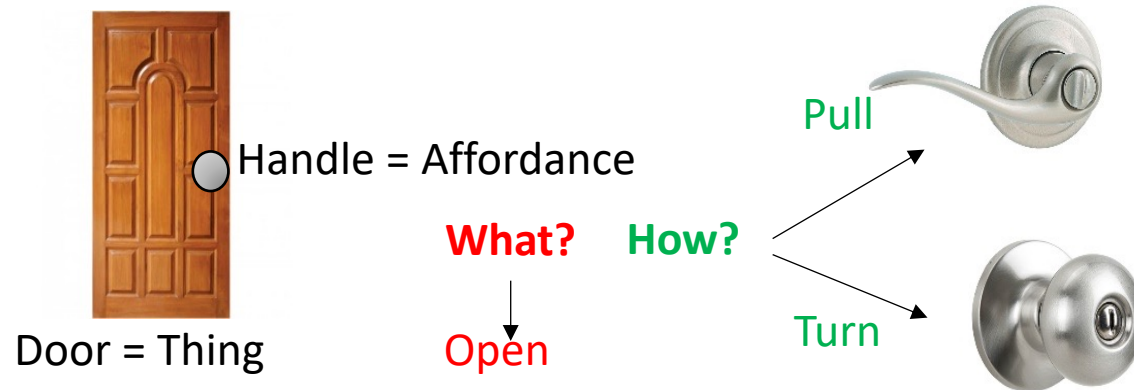
- W3C Working Group goal: Adapting web technologies to IoT
- Already published: Thing Description (TD) metadata format
 - TD describes the available interactions (network API) of a Thing
- New deliverables in progress, including Discovery
 - How does a potential user obtain the TD for a Thing?



Descriptive Interoperability: TDs

WoT Architecture

- Constraints
 - "Things" must have a TD
 - Must use URIs, IANA media types, etc.
- Thing Description Affordances
 - Describes WHAT the possible choices are
 - Describes HOW to interact with the Thing



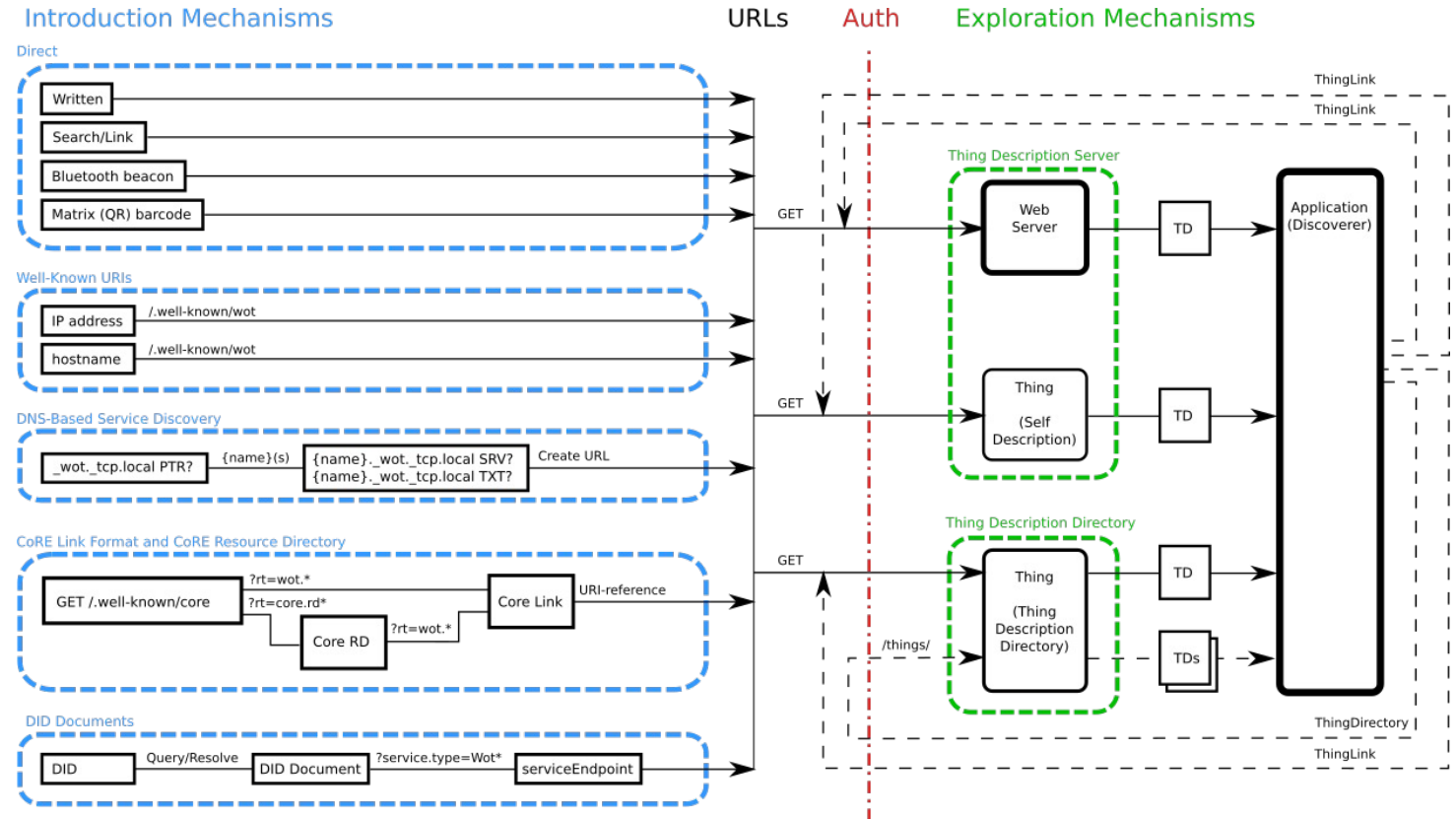
WoT Thing Description (TD)

```
{
  "@context": [
    "https://www.w3.org/2022/wot/td/v1.1",
    { "iot": "http://iotschema.org/" }
  ],
  "id": "urn:dev:org:32473:1234567890",
  "title": "MyLEDThing",
  "description": "RGB LED torchiere",
  "@type": ["Thing", "iot:Light"],
  "securityDefinitions": {
    "default": {"scheme": "bearer"}
  },
  "security": ["default"],
  "properties": {
    "brightness": {
      "@type": ["iot:Brightness"],
      "type": "integer",
      "minimum": 0,
      "maximum": 100,
      "forms": [ ... ]
    }
  },
  "actions": {
    "fadeIn": {
      ...
    }
  }
}
```

Discovery

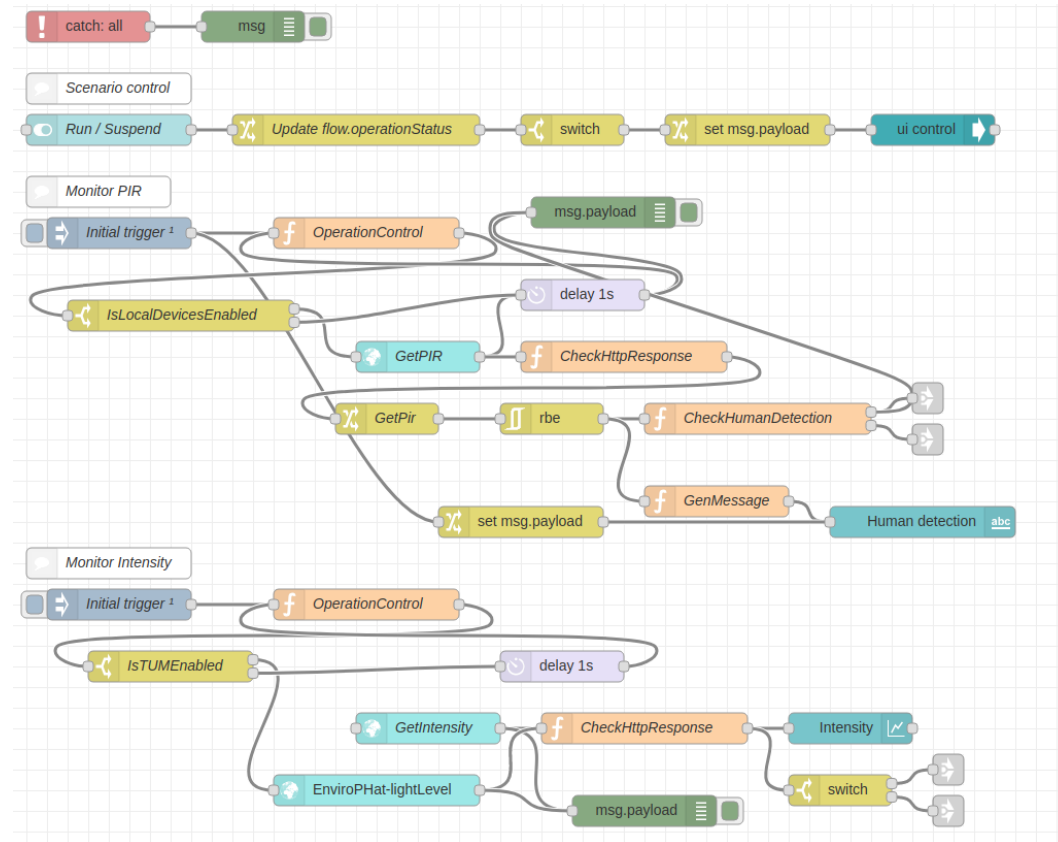
Goal: Obtain TD of interest

- Not limited to local network
- Scalable to many TDs
- Need to preserve privacy
- Phased access:
 1. Introduction: open
 2. Exploration: controlled
- Searchable via JSON Path, XPath, or SPARQL
- Future work:
 - Find "nearby" Things using geospatial data

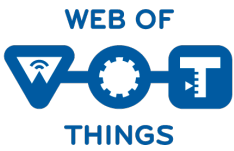


Orchestration

Node-RED/node-gen



node-wot/Scripting API



```
WoTHelpers.fetch( "coap://localhost:5683/counter" ).then( async (td) => {  
  // using await for serial execution (note 'async' in then() of fetch())  
  try {
```

```
    const thing = await WoT.consume(td);  
    console.info( "=== TD ===" );  
    console.info(td);  
    console.info( "===== " );
```



```
    // read property #1
```

```
    const read1 = await thing.readProperty( "count" );  
    console.info( "count value is" , await read1.value());
```

```
    // increment property #1 (without step)
```

```
    await thing.invokeAction( "increment" );  
    const inc1 = await thing.readProperty( "count" );  
    console.info( "count value after increment #1 is" , await inc1.value());
```

```
    // increment property #2 (with step)
```

```
    await thing.invokeAction( "increment" , { 'step' : 3 });  
    const inc2 = await thing.readProperty( "count" );  
    console.info( "count value after increment #2 (w/ step 3) is" , await inc2.value());
```

```
    // decrement property
```

```
    await thing.invokeAction( "decrement", undefined, {  
      formIndex: getFormIndexForDecrementWithCoAP(thing);  
    });  
    const dec1 = await thing.readProperty( "count" );  
    console.info( "count value after decrement is" , await dec1.value());
```

```
  } catch(err) {  
    console.error( "Script error:", err);  
  }
```

```
}).catch( (err) => { console.error( "Fetch error:", err); });
```

WoT New Deliverables

REC Track:

- WoT Architecture 1.1
- WoT Thing Description 1.1
- WoT Discovery

→ Passed AC PR voting

→ Releasing RECs end Nov

Note Track:

- Updated WoT Scripting API
- Updated WoT Binding Template

Web of Things (WoT) Architecture 1.1

W3C Proposed Recommendation 11 July 2023



More details about this document

This version:

<https://www.w3.org/TR/2023/PR-wot-arch-1.1/>

Latest published version:

<https://www.w3.org/TR/wot-arch-1.1/>

Latest editor's draft:

<https://w3c.github.io/wot-arch-1.1/>

History:

<https://www.w3.org/standards/history/wot-arch-1.1/>
Commit history

Implementation report:

<https://w3c.github.io/wot-arch-1.1/>

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Former editors:

Web of Things (WoT) Thing Description 1.1

W3C Proposed Recommendation 11 July 2023



More details about this document

This version:

<https://www.w3.org/TR/2023/PR-wot-thing-desc-1.1/>

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<https://w3c.github.io/wot-thing-description-1.1/>

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Implementation report:

<https://w3c.github.io/wot-thing-description-1.1/>

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Web of Things (WoT) Discovery

W3C Proposed Recommendation 11 July 2023



More details about this document

This version:

<https://www.w3.org/TR/2023/PR-wot-discovery-20230711/>

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<https://www.w3.org/TR/wot-discovery-1.1/>

Latest editor's draft:

<https://w3c.github.io/wot-discovery/>

History:

<https://www.w3.org/standards/history/wot-discovery-1.1/>
Commit history

Implementation report:

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

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Web of Things (WoT) Binding Templates

W3C Editor's Draft 12 July 2023



More details about this document

This version:

<https://w3c.github.io/wot-binding-templates/>

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<https://www.w3.org/TR/wot-binding-templates-1.1/>

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Web of Things (WoT) Scripting API

W3C Editor's Draft 26 May 2023



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This version:

<https://w3c.github.io/wot-scripting-api/>

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Deliverables

New/Updated Normative Documents:

- Architecture 1.1: <https://github.com/w3c/wot-architecture>
- Thing Description 1.1: <https://github.com/w3c/wot-thing-description>
- Discovery: <https://github.com/w3c/wot-discovery>
- Profiles: <https://github.com/w3c/wot-profile>

New/Updated Informative Documents:

- Binding Templates: <https://github.com/w3c/wot-binding-templates>
- Scripting API: <https://github.com/w3c/wot-scripting-api>
- Use Cases and Requirements: <https://github.com/w3c/wot-usecases>

Community Resources:

- Web Site: <https://www.w3.org/WoT/>

“WoT 2.0” Just Started

- → a good time to join the WG and become part of the WoT family
- More details:
<https://www.w3.org/2023/08/wot-wg-2023-draft.html>



PROPOSED Web of Things Working Group Charter

The **mission** of the [Web of Things Working Group](#) is to counter the fragmentation of the Internet of Things (IoT) through the specification of building blocks that enable easy integration of IoT devices and services across IoT platforms and application domains. These building blocks complement and enhance the use of existing standards; provide a common description across different ecosystems, standards, and communities; and provide prescriptive definitions where appropriate.

[Join the Web of Things Working Group.](#)

This proposed charter is available on [GitHub](#). Feel free to raise [issues](#).

Charter Status	See the group status page and detailed change history .
Start date	<i>1 September 2023 (ESTIMATED) (date of the "Call for Participation", when the charter is approved)</i>
End date	<i>1 September 2025 (ESTIMATED; Start date + 2 years)</i>
Chairs	<i>Sebastian Kaebisch (Siemens), Michael McCool (Intel), and Michael Koster (Invited Expert) (PROPOSED)</i>
Team Contacts	Kazuyuki Ashimura (0.2 FTE)
Meeting Schedule	<p>Teleconferences: Weekly with additional topic specific calls as appropriate.</p> <p>Face-to-face: We will meet during the W3C's annual Technical Plenary week; additional face-to-face meetings may be scheduled by consent of the participants, with no more than four (4) face-to-face meetings in total per year.</p>

Background
Scope
Deliverables
Success Criteria
Coordination
Participation
Communication
Decision Policy
Patent Policy
Licensing
About this Charter

<https://www.takenaka.co.jp/news/2021/05/02/>

Takenaka Corporation

- CGLL Platform - BIM

<https://netzo.io/>

Netzo

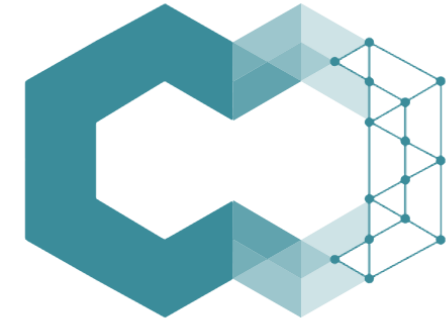
- IoT Data Hub
- Dashboards

<https://new.siemens.com/global/en/products/buildings/automation/designo.html>

<https://www.evosoft.com/en/digitalization-offering/saywot/>

Siemens

- Desigo CC – BIM
- Say WoT!



<https://www.eclipse.org/ditto/2022-03-03-wot-integration.html>

Bosch

- Eclipse Ditto - Digital twin

SDO Adoption or Under Consideration

ECHONET



Conexxus



OPC Foundation
(OPC UA Web-of-Things Connectivity)



IPA Digital Architecture Design Center



Industrial Digital Twin Association
(Asset Interfaces Description)



Resources and Contacts

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

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