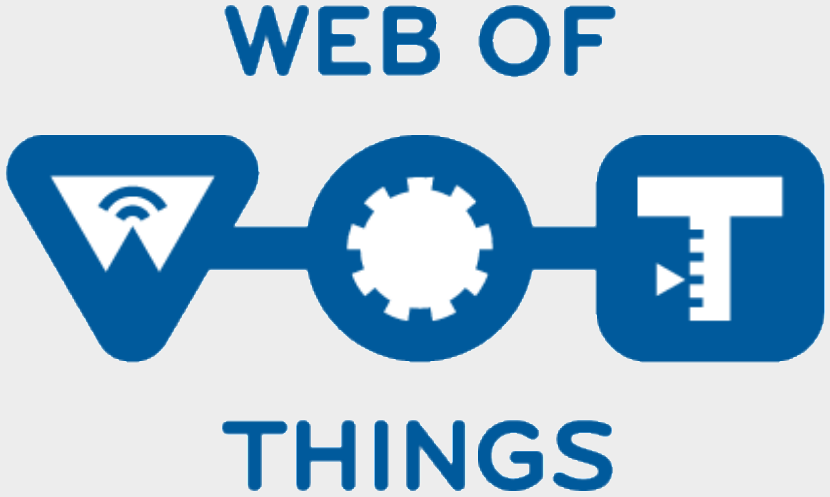


Web of Things Live Demonstration

Sebastian **Käbisch** | Siemens AG | W3C Web of Things WG/IG Co-Chair

November 12, 2025, TPAC 2025 Breakout Session

Agenda

1. Welcome

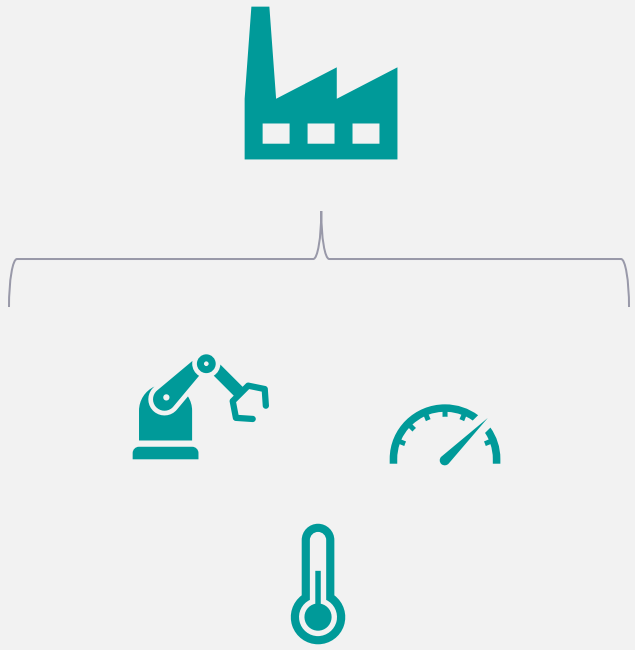
2. Insight into WoT (Sebastian; 10min)

3. PlugFest Demos from different companies / institutes (50min)
   - Cu Pham (ECHONET)
   - David Ezell, Joshua Thomas, Denis Ioan (Conexxus / ArmorSafe)
   - Kunihiko Toumura (Hitachi)
   - Kensaku Komatsu (NTT inc)
   - Piotr Sowinski (NeverBlink)

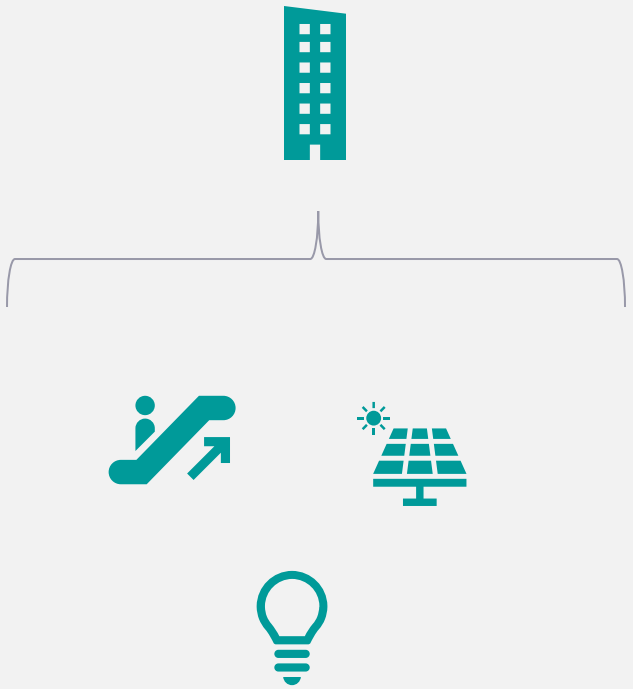
It’s about the *Things* that are used in application domains

WEB OF THINGS

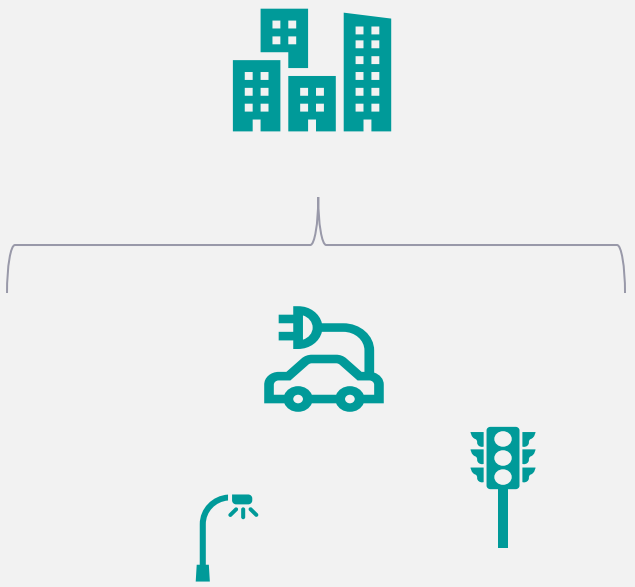
Factory



Building

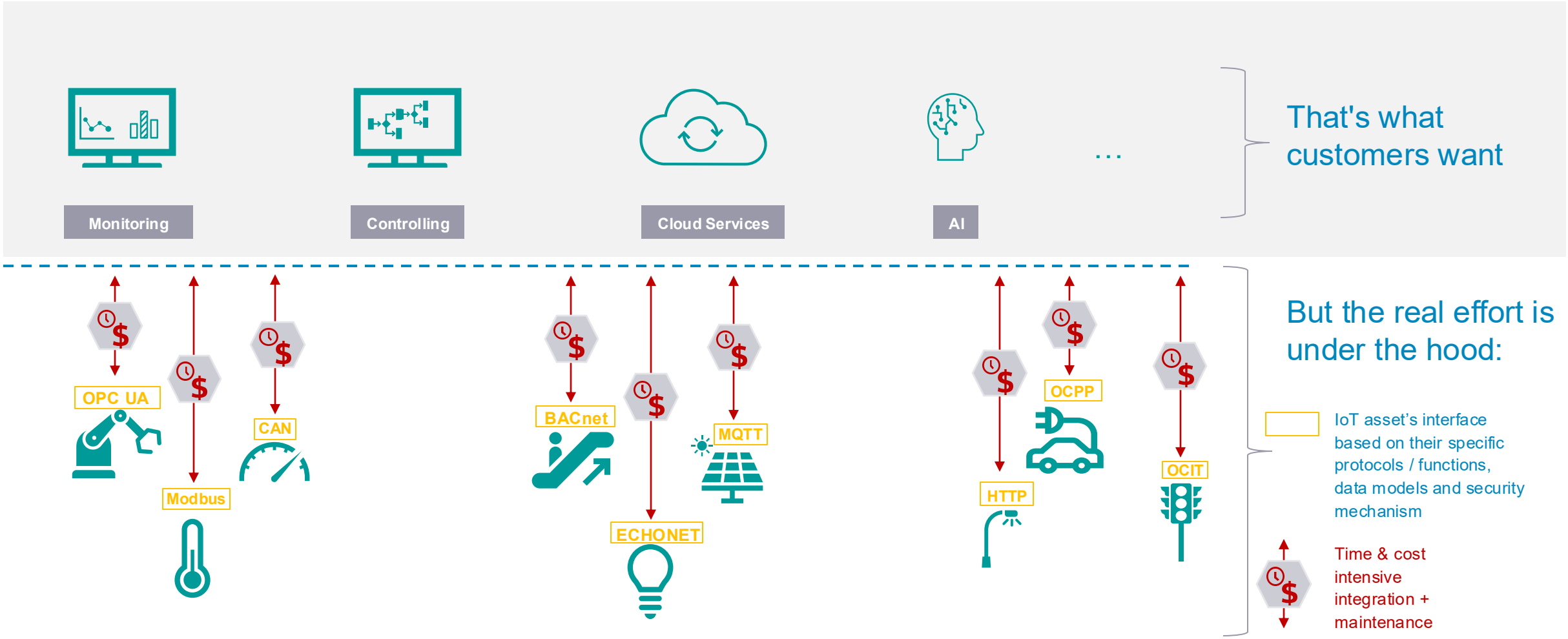


City

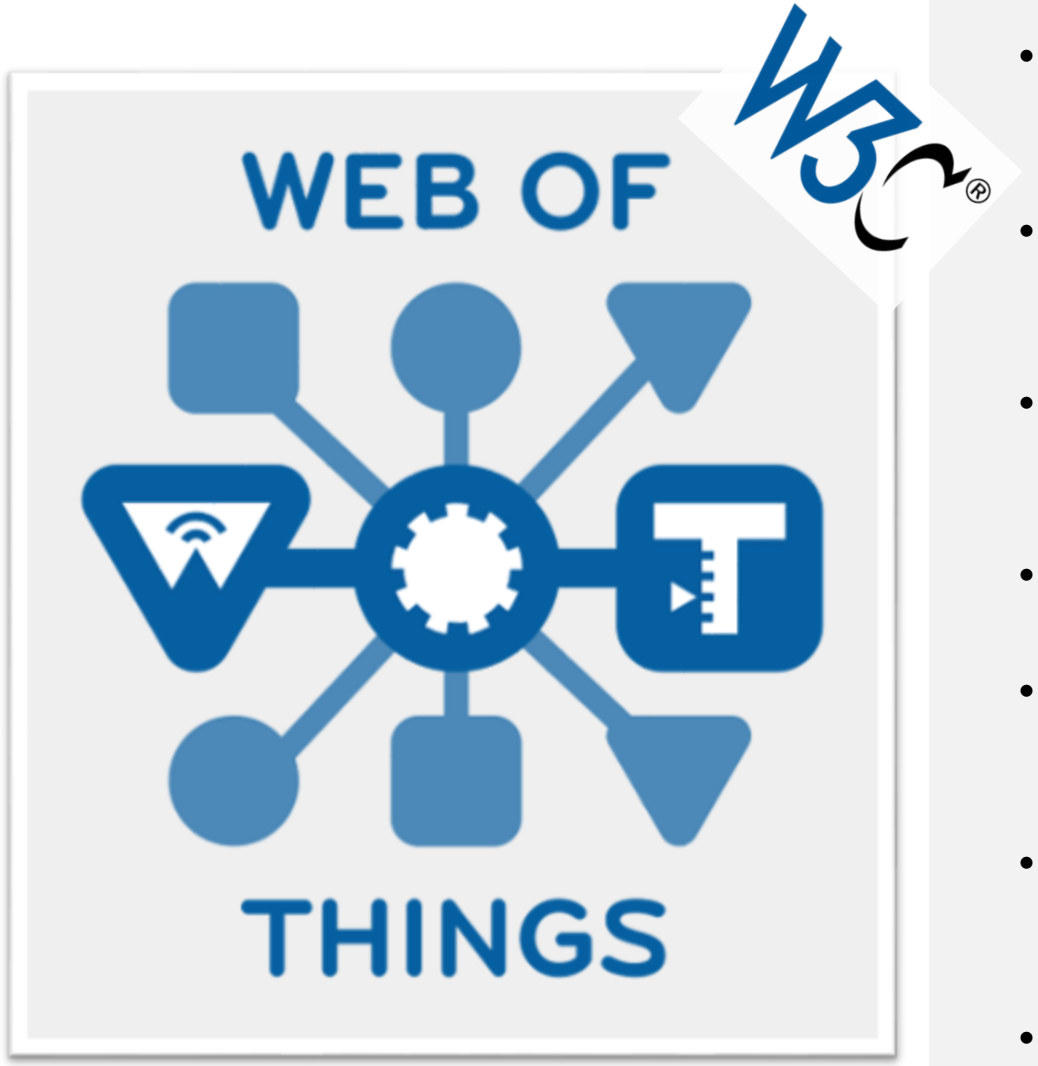


...

There is a common problem if you want to use Things smart: Onboarding



Enter the W3C Web of Things



- **Objective**: Make onboarding as easy as possible (Plug&Play) and simplify IoT application development
- Based on IT-Friendly technologies, reuse established Web standards
- Works with all protocols (MQTT, HTTP, Modbus, OPC UA, BACnet, KNX IoT,…)
- Applicable to any application domain
- Key technology: Standardized Device Description Language called **WoT Thing Description (TD)**
- More building blocks: Scripting API, Discovery, Security & Privacy Guidelines, WoT Bindings
- Published the 1.1 versions; currently working on WoT 2.0

WoT Thing Description

Standardized machine and human readable device interface descriptions based on JSON-LD

```jsonc
{
    "@context": "https://www.w3.org/2022/wot/td/v1.1",
    "title": "Siemens SENTRON PAC4200",
    "base": "modbus+tcp://192.168.10.100:502/1/",
    "description": "The SENTRON PAC4200 is a measuring device fo
    "support": "https://support.industry.siemens.com/dl/dl-media/
    "securityDefinitions": {
        "nosec_sc": {
            "scheme": "nosec"
        }
    },
    "security": "nosec_sc",
    "properties": {
        "voltage_l1_n": {
            "title": "Voltage L1-N",
            "type": "number",
            "unit": "V",
            "forms": [
                {
                    "href": "40001?quantity=2",
                    "contentType": "application/octet-stream",
                    "modv:function": "readHoldingRegisters",
                    "modv:type": "xsd:float",
                    "modv:mostSignificantByte" : true,
                    "modv:mostSignificantWord" : true,
                }
            ]
        },
        "voltage_l2_n": {
            "title": "Voltage L2-N",
            "type": "number",
            "unit": "V",
            "forms": [
                {
                    "href": "40003?quantity=2",
                    "contentType": "application/octet-stream",
```

W3C Recommendation

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
File a bug
Commit history
Pull requests

Contributors:
In the GitHub repository

Repository:
We are on GitHub
File a bug

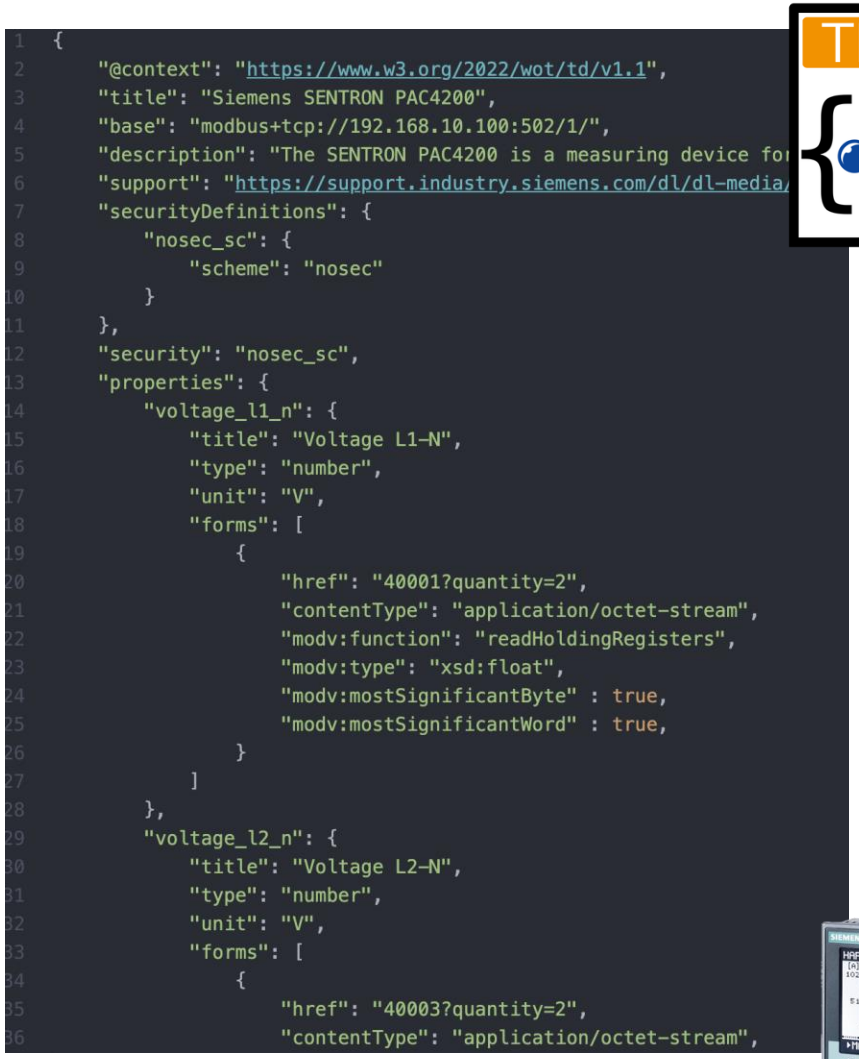
Please check the **errata** for any errors or issues reported since publication.

See also **translations**.

Abstract

WoT Thing Description

Standardized machine and human readable device interface descriptions based on JSON-LD



Provides details about …

… the interface endpoint
(e.g., IP and port address)

… the used protocols and serializations
(e.g., Modbus, OPC UA, UA Binary, JSON, …)

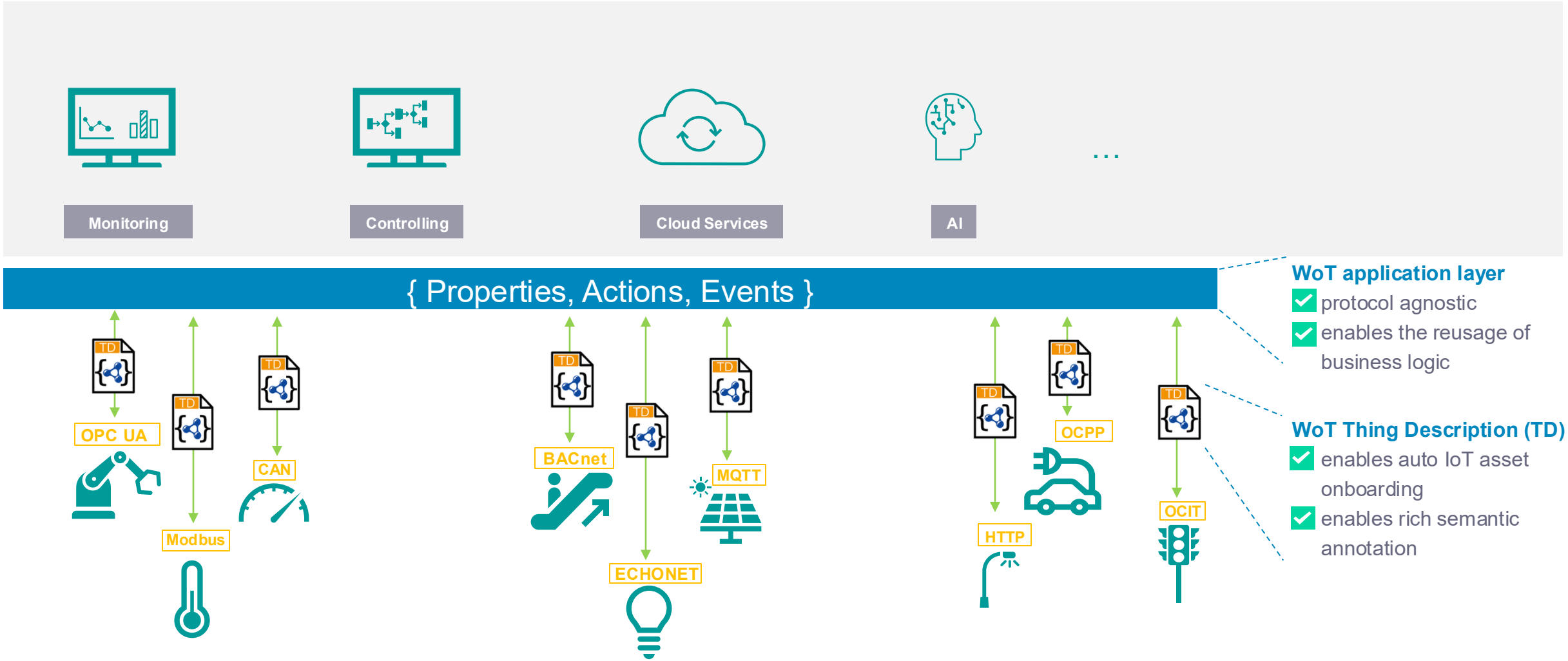
… what kind of data and functions are served
(e.g., voltage values, on/off,…)

… how the payload structure look like
(e.g., simple types, complex types)

… context and semantics
(e.g., based on ECLASS, OPC UA DM, …)

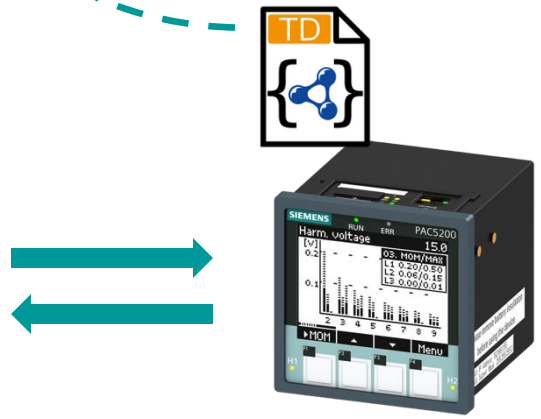
… security requirements
(e.g., Bearer, OAuth2, …)

W3C WoT simplifies the Thing onboarding and IoT application development



Concentrate on the business logic, hide protocol specifics

```
1   const TD_PATH = "file://TDs/Siemens/Sentronpac.td.jsonld";
2   const sentronTD= WoT.fetch(TD_PATH)
3   let sentron = WoT.consume(sentronTD)
4   setInterval(() => {
5
6       // read total active power value
7       let totActPw = sentron.readProperty("Total_Active_Power")
8       console.log(totActPw)
9
10      // adjust metering rate based on the hour
11      if (time.getUTCHours() > 20) {
12          sentron.invokeAction("changeRate", 1)
13      } else {
14          sentron.invokeAction("changeRate", 0)
15      }
16  }, 10000) // read every 10 seconds
```



https://github.com/eclipse-thingweb/node-wot

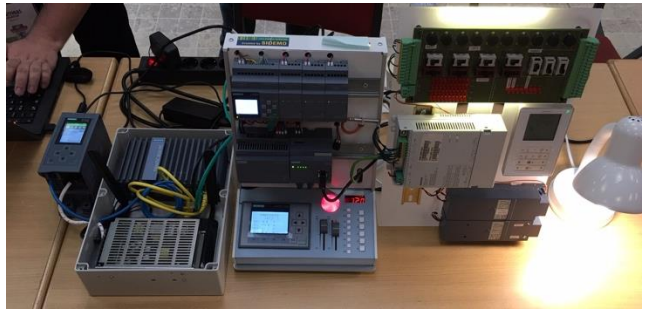
WoT PlugFests for testing and evaluating new features

Agile Process

Features motivated by the requirements of use cases.

Continuous testing and refinement (WoT Plugfest).

Registry for bindings to existing ecosystems.



TPAC2025 WoT PlugFests Network Configuration

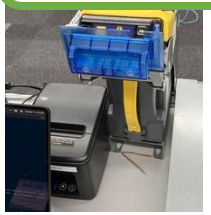
Room 307

Plugfest wifi / Ethernet

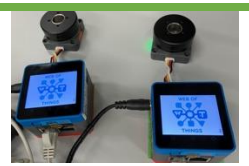
TPAC
WiFi

Internet

Conexxus
Cash Deposit Device



Hitachi
Motor/Encoder



ECHONET
WoT Proxy

Consumers
(Hitachi, Conexxus,
NeverBlink, ...)

ECHONET lite
Web API GW

mobile
router

ECHONET lite
controller

Door

AirCon

Light

ECHONET
remote devices
(in Ishikawa)