W3C WoT WG
TD Type System and Namespace Breakout Session

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Osaka

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Agenda

- JSON Schema
  à https://github.com/w3c/wot-thing-description/issues/5

- TD Namespace
  à https://github.com/w3c/wot-thing-description/issues/3

TD Current Working Assumption

```
{
"@context": ["http://w3c.github.io/wot/w3c-wot-td-context.jsonld",
                        { "sensor": "http://example.org/sensors#" }
                       ],
  "@type": "Thing",
  "name": "MyTemperatureThing",
  "interactions": [
    {
      "@type": ["Property","sensor:Temperature"],
      "name": "temperature",
      "sensor:unit": "sensor:Celsius",
      "outputData": {"valueType": { "type": "number" }},
      "writable": false,
      "links": [{
        "href": "coap://mytemp.example.com:5683/",
        "mediaType": "application/json"
        }]
    }
  ]
}
```

W3C Editor's Draft 06 March 2017
https://w3c.github.io/wot-thing-description/

TD Context
- minimal vocabulary set
- standardized by W3C WoT

'External' Context
- enrich definitions within TD with additional semantics
- is not to be standardized by W3C WoT
- reuse existing domain specific or unspecific vocabularies, e.g., from schema.org, OneM2M,….

Data Schema Definition
- per default IETF JSON Schema
- working on semantic annotations

Missing Thing in JSON Schema

E.g., A TD serves a WoT Property ‘status‘ of a thermostat. ‘status‘ defines an object with multiple data (JSON Schema snipped):

```
{
            ...
    "os": {"type": "string"},
    "fv": {"type": "string"},
    "sr": {"type": "number"},
    "cvc": {"type": "number"},
    "cvf": {"type": "number"}
            ...
}
```

Where is the temperature value data measured in Celsius?

Use Case:
Servient 1 (weather station) needs only a temperature value in Celsius {“type”:”number”}

Servient 2 (thermostat) can serve such a value in a WoT Property resource (=status), however, that Property has also a bundle of other data (e.g., as declared above) that is exchange when resource is called

From PlugFest scenario: Display could not show temperature value since the embedded temperature sensor was broken. Temperature value had to be organized from somewhere else.

What we need in JSON Schema

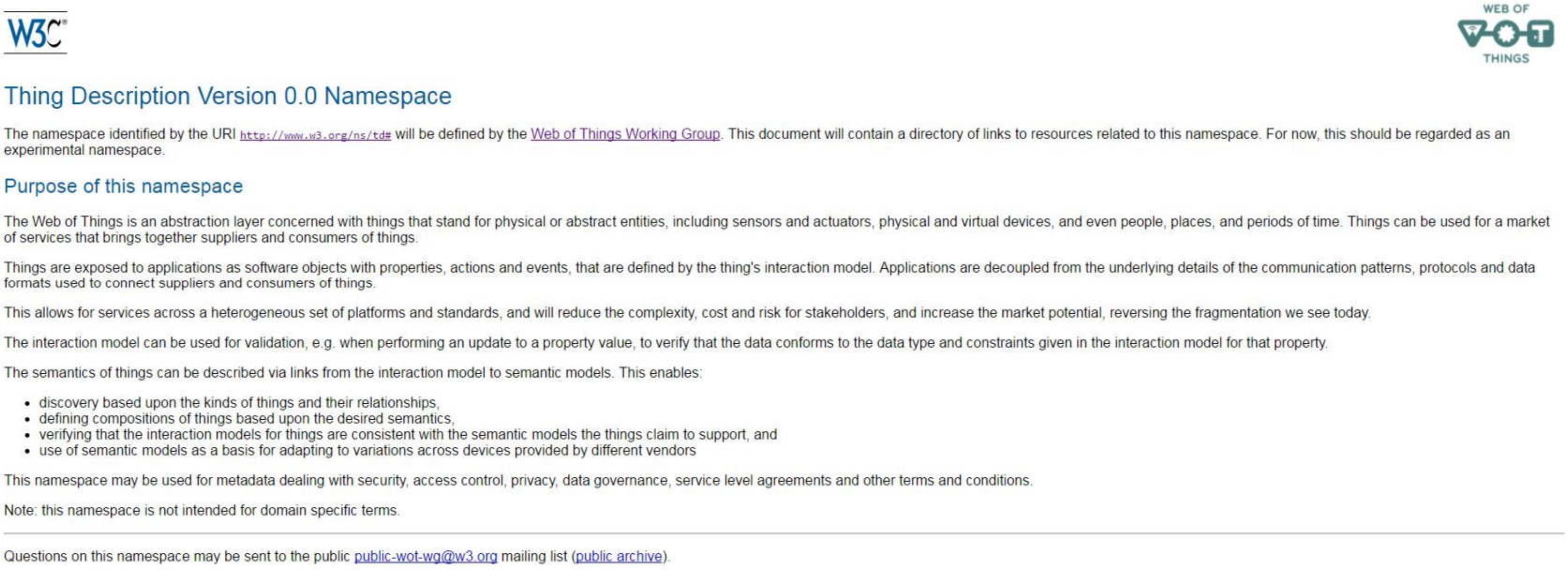
```
{                                                    ...
    "os": {"type": "string", "@semantic": "http://example.com/isOnlineSince"},
    "fv": {"type": "string", "@semantic": "http://example.com/versionOfFirmware"},
    "sr": {"type": "number", "@semantic": "http://example.com/sampleRate" },
    "cvc": {"type": "number", "@semantic": "http://example.com/celsiusTemperatureValue"},
    "cvf": {"type": "number", "@semantic": "http://example.com/fahrenheitTemperatureValue"}
                                                     ...
}
```

Allow semantic annotation to refer to existing concepts and to make declared JSON keys in JSON Schema machine interoperable.

Note: @semantic is only a proposal. Alternative @type or @modelReference

à @type would be aligned with JSON-LD

TD Namespace



Thing Description Version 0.0 Namespace

The namespace identified by the URI http://www.w3.org/ns/td# will be defined by the Web of Things Working Group. This document will contain a directory of links to resources related to this namespace. For now, this should be regarded as an experimental namespace.

Purpose of this namespace

The Web of Things is an abstraction layer concerned with things that stand for physical or abstract entities, including sensors and actuators, physical and virtual devices, and even people, places, and periods of time. Things can be used for a market of services that brings together suppliers and consumers of things.

Things are exposed to applications as software objects with properties, actions and events, that are defined by the thing's interaction model. Applications are decoupled from the underlying details of the communication patterns, protocols and data formats used to connect suppliers and consumers of things.

This allows for services across a heterogeneous set of platforms and standards, and will reduce the complexity, cost and risk for stakeholders, and increase the market potential, reversing the fragmentation we see today.

The interaction model can be used for validation, e.g. when performing an update to a property value, to verify that the data conforms to the data type and constraints given in the interaction model for that property.

The semantics of things can be described via links from the interaction model to semantic models. This enables:

- discovery based upon the kinds of things and their relationships,
- defining compositions of things based upon the desired semantics,
- verifying that the interaction models for things are consistent with the semantic models the things claim to support, and
- use of semantic models as a basis for adapting to variations across devices provided by different vendors

This namespace may be used for metadata dealing with security, access control, privacy, data governance, service level agreements and other terms and conditions.

Note: this namespace is not intended for domain specific terms.

Questions on this namespace may be sent to the public public-wot-wg@w3.org mailing list (public archive).

- currently, a generic https://www.w3.org/ns/td is reserved
- Problem: E.g., TD 1.0 version will be released in 2018 and an updated TD 2.0 version in 2023. How we make the differentiation by using this generic namespace?
- group prefers to have a date in the namespace, e.g., http://www.w3.org/2018/01/WoT-td
  or
  http://www.w3.org/2018/01/01-WoT-td