INCREASE WOT IMPACT USING TRANSFERABLE VALIDATION

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The Thing Description (TD) is a central building block in the W3C Web of Things (WoT). The accompanying semantic schema makes TD data models machine-understandable. The data schema vocabulary – reflecting a subset of the terms defined in JSON Schema in a Linked Data representation – allows syntactically validating Thing Description instances serialized in JSON-LD 1.1. The TD thus enables standardized interactions across the WoT.

The semantic schema allows linking Things described using TDs to any (pre-existing) Linked Data set. However, correct functioning of WoT servients requires validation. To make sure existing data can be use in the WoT, the existing Linked Data sets need to be assessed against the data schema vocabulary of TD.

Meanwhile, W3C recommends SHACL to describe general data shapes. For Linked Data sets that are described using SHACL shapes, validation is already in place. Still, for correct functioning in the WoT, an additional validation would be required using the TD data schema.

A mapping between validation using the TD data schema and SHACL is needed. On the one hand, this would increase interoperability between WoT and pre-existing static and dynamic datasets. On the other hand, different use cases could require using different validation languages (e.g., SHACL also supports graph-based validation, as opposed to tree-based validation of JSONSchema).

A detailed comparison between the two validation languages is needed to help investigate which structures can be mapped 1-to-1. These mappings can then be specified using a set of unambiguous rules. Using Validatrr[1], a validation engine based on rule-based reasoning, we can provide validation, both using the TD data schema and the SHACL description, and provide the translated versions between them.

As a result, TDs can be validated in a non-WoT context, and existing Linked Data can be validated in a WoT context. This allows better interoperability across domains, and increases impact of WoT technologies.

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[1] https://idlabresearch.github.io/validatrr/