FACULTY OF ENGINEERING AND ARCHITECTURE

IDLab
INTERNET & DATA LAB

INCREASE WOT IMPACT USING TRANSFERABLE VALIDATION

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imec

Validation for WoT

Thing Description data schema

```
{"definitions": {
  "thing-context-w3c-uri": {
    "type": "string",
    "enum": [ "https://www.w3.org/2019/wot/td/v1" ] },
  "thing-context": {
    "oneOf": [
      { "type": "array",
        "items": {
          "anyOf": [{ "$ref": "#/definitions/anyUri" }, { "type": "object" } ] },
        "contains": { "$ref": "#/definitions/thing-context-w3c-uri" } },
      { "$ref": "#/definitions/thing-context-w3c-uri" } ] },
  "type_declaration": {
    "oneOf": [
      { "type": "string" },
      { "type": "array", "items": { "type": "string" } } ] },
  "property_element": {
    "type": "object", "properties": {
      "@type": { "$ref": "#/definitions/type_declaration" },
```

Validation for Linked Data

SHACL (W3C recommendation)

```
<#shape>
  sh:property [ sh:path <#thing-context-w3c-uri> ;
    sh:datatype xsd:string ;
    sh:in ( "https://www.w3.org/2019/wot/td/v1" )
  ] , [ sh:path <#thing-context> ;
    sh:or (
      [ sh:node shsh:listA ]
      [ sh:node <#thing-context-w3c-uri-shape> ] ) .
shsh:listA shsh:or ( <#anyUri-shape> <#object-shape> ) .
<#shape>
  sh:property [ sh:path <#type_declaration> ;
    sh:or (
      [ sh:datatype xsd:string ] ;
      [ sh:node shsh:listB ] ) ] .
shsh:listB shsh:datatype xsd:string .
<#shape>
  sh:property [ sh:path <#property_element> ;
    sh:node <#property_element-shape> ] .
```

Validation mismatch

TD data schema

```
{"definitions": {
  "thing-context-w3c-uri": {
    "type": "string",
    "enum": [ "https://www.w3.org/201
  "thing-context": {
    "oneOf": [
      { "type": "array",
        "items": {
          "anyOf": [{ "$ref": "#/defi
        "contains": { "$ref": "#/defi
      { "$ref": "#/definitions/thing-
  "type_declaration": {
    "oneOf": [
      { "type": "string" },
      { "type": "array", "items": { "
  "property_element": {
    "type": "object", "properties": {
      "@type": { "$ref": "#/definitio
```

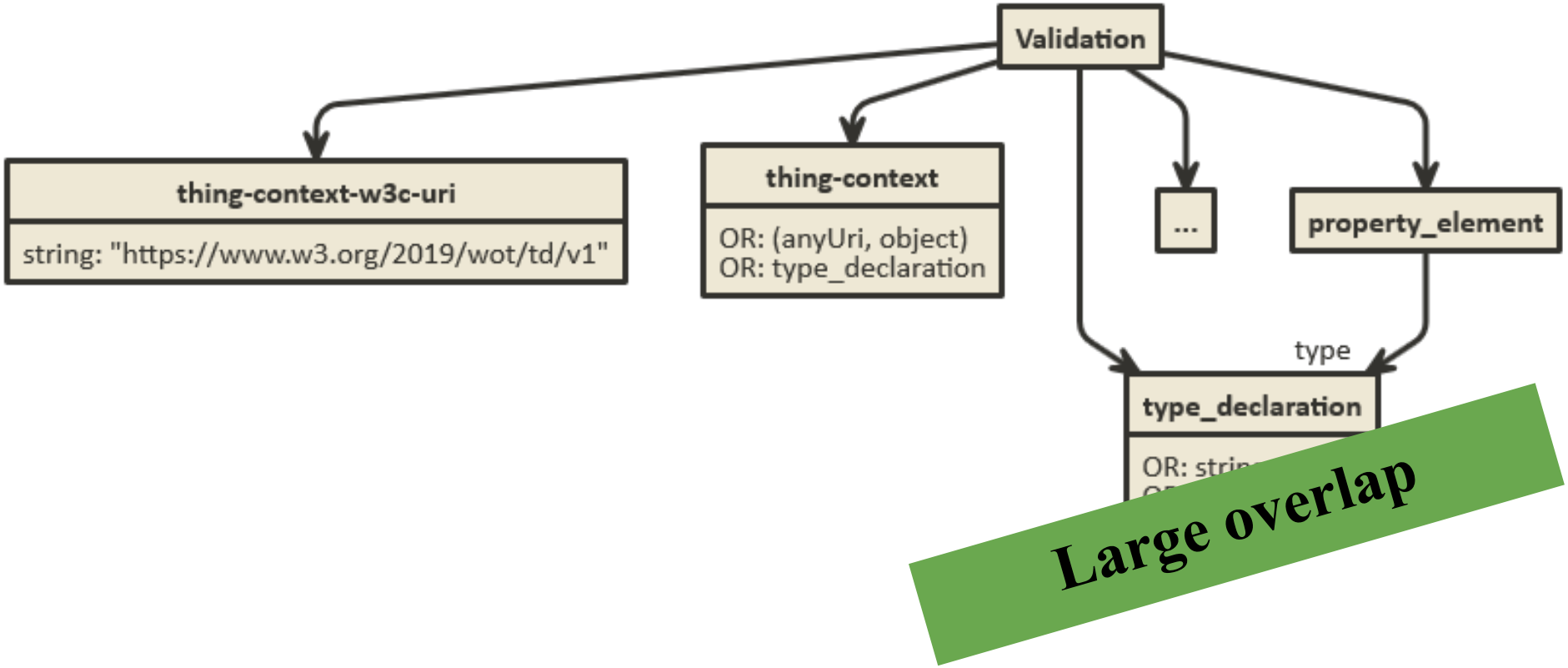
SHACL

```
<#shape>
  sh:property [ sh:path <#thing-context-w3c
    sh:datatype xsd:string ;
    sh:in ( "https://www.w3.org/2019/wot/td
  ] , [ sh:path <#thing-context> ;
    sh:or (
      [ sh:node shsh:listA ]
      [ sh:node <#thing-context-w3c-uri-sha
shsh:listA shsh:or ( <#anyUri-shape> <#obje
<#shape>
  sh:property [ sh:path <#type_declaration>
    sh:or (
      [ sh:datatype xsd:
      [ sh:node
shsh:li
<#sha
  sh:p                    th <#property_element>
    sh                    #property_element-shape> ] .
```

 # Languages
 # Tools

Validation mismatch... or not?

Thing Description SHACL



Mapping is needed

TD data schema

```
{"definitions": {
  "thing-context-w3c-uri": {
    "type": "string",
    "enum": [ "https://www.w3.org/201
  "thing-context": {
    "oneOf": [
      { "type": "array",
        "items": {
          "anyOf": [{ "$ref": "#/defi
        "contains": { "$ref": "#/defi
      { "$ref": "#/definitions/thing-
  "type_declaration": {
    "oneOf": [
      { "type": "string" },
      { "type": "array", "items": { "
  "property_element": {
    "type": "object", "properties": {
      "@type": { "$ref": "#/definitio
```

SHACL

```
<#shape>
  sh:property [ sh:path <#thing-context-w3c
    sh:datatype xsd:string ;
    sh:in ( "https://www.w3.org/2019/wot/td
  ] , [ sh:path <#thing-context> ;
    sh:or (
      [ sh:node shsh:listA ]
      [ sh:node <#thing-context-w3c-uri-sha
shsh:listA shsh:or ( <#anyUri-shape> <#obje
<#shape>
  sh:property [ sh:path <#type_declaration>
    sh:or (
      [ sh:datatype xsd:string ] ;
      [ sh:node shsh:listB ] ) ] .
shsh:listB shsh:datatype xsd:string .
<#shape>
  sh:property [ sh:path <#property_element>
    sh:node <#property_element-shape> ] .
```

Better integration
WoT and Linked Data

Complementary

Integrate Linked Data sets with WoT

Using the mapping, you can validate both:
https://idlabresearch.github.io/validatrr/

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