

iot.schema.org

August 23, 2017

# Current Layers of [iot.schema.org](http://iot.schema.org)

- Capability Schema
  - Capability pattern
- Capability
  - LevelCapability
- Interaction Pattern
  - CurrentLevel, SetLevel, TransitionTime
- Data Type
  - LevelData, TransitionTimeData

# Current Layers of [iot.schema.org](http://iot.schema.org)

- Capability Schema
    - Capability pattern
  - Capability
    - LevelCapability
  - Interaction Pattern
    - CurrentLevel, SetLevel, TransitionTime
  - Data Type
    - LevelData, TransitionTimeData
- 
- Common
- Domain

# Example iotschema Definition

```
"@id": "LevelCapability",
"@type": "rdfs:Class",
"rdfs:subClassOf": { "@id": "Capability" },
"rdfs:comment": "Level Sensing and Control Capability",
"rdfs:label": "Level Capability",
"domain": { "@id": "Common" },
"providesInterctionPattern": [
{
  "@id": "CurrentLevel",
  "@type": "rdfs:Class",
  "rdfs:subClassOf": { "@id": "Property" }
  "acceptsInputData": {
    "@id": "LevelData",
    "domain": { "@id": "Common" },
    "rdfs:comment": "Level data",
    "rdfs:label": "Level Data",
    "rdfs:subClassOf": { "@id": "schema:PropertyValue" },
    "schema:propertyType": { "@id": "schema:Number" },
    "schema:unitCode": { "@id": "qudt:Percent" }
    "rdfs:comment": "Current level property",
    "rdfs:label": "Current Level"
  },
},
(providesOutputData)
```

# Example Definition (cont'd)

```
{
  "@id": "TransitionTime",
  "@type": "rdfs:Class",
  "rdfs:subClassOf": { "@id": "Property" }
  "acceptsInputData": {
    "@id": "TransitionTimeData",
    "domain": { "@id": "Common" },
    "rdfs:comment": "Transition time",
    "rdfs:label": "Transition Time",
    "rdfs:subClassOf": { "@id": "schema:PropertyValue" },
    "schema:propertyType": { "@id": "schema:Number" },
    "schema:unitCode": { "@id": "qudt:SecondTime" }
  },
  "providesOutputData": {
    "@id": "TransitionTimeData",
    "domain": { "@id": "Common" },
    "rdfs:comment": "Transition time",
    "rdfs:label": "Transition Time",
    "rdfs:subClassOf": { "@id": "schema:PropertyValue" }
    "schema:propertyType": { "@id": "schema:Number" },
    "schema:unitCode": { "@id": "qudt:SecondTime" }
  }
},
```

# Example Definition (cont'd)

```
{
  "@id": "SetLevel",
  "@type": "rdfs:Class",
  "rdfs:subClassOf": { "@id": "common:Action" },
  "rdfs:comment": "Set level Action",
  "rdfs:label": "Set Level Action",
  "domain": { "@id": "Common" },
  "acceptsInputData": [
    { "@id": "TransitionTimeData" },
    { "@id": "LevelData" }
  ]
}
```

# Example Instance – TD Interaction

```
{
  "@context": [
    "http://w3c.github.io/wot/w3c-wot-td-context.jsonld",
    "http://w3c.github.io/wot/w3c-wot-common-context.jsonld",
    {"iotschema": "http://iot.schema.org/common#"}],
  "@type": [ "Thing", "BuildingSpace" ],
  "name": "Lamp",
  "capability" : "iotschema:LevelCapability",
  "interactions": [{
    "name": "Set brightness level",
    "@type": ["Action", "iotschema:SetLevel"],
    "inputdata": {
      "type": "object",
      "properties": {
        "level": {
          "type": ["iotschema:LevelData", "number"]},
        "time": {"type": ["iotschema:TransitionTimeData", "number"]}
      }
    },
    "link": [{
      "href": "/example/light/setbrightness",
      "mediatype": "application/json"
    }]
  }],
}
```

# Example Instance – TD Interaction (2)

```
{
  "name": "Current brightness level",
  "@type": ["Property", "iotschema:CurrentLevel"],
  "inputdata": { "type": ["iotschema:LevelData", "number"] },
  "outputdata": { "type": ["iotschema:LevelData", "number"] },
  "link": [
    {
      "href": "/example/light/currentbrightness",
      "mediatype": "application/json"
    }
  ],
  {
    "name": "Transition time",
    "@type": ["Property", "iotschema:TransitionTime"],
    "inputdata": {"type": ["iotschema:TransitionTimeData", "number"] },
    "outputdata": {"type": ["iotschema:TransitionTimeData", "number"] },
    "link": [
      {
        "href": "/example/light/transitionTime",
        "mediatype": "application/json"
      }
    ]
  }
}]}
```



# Why Shape Constraints?

- A capability is the set of affordances needed to interact with a single function of a connected thing
- Shapes enable validation of these affordances, which is useful when connected things from different ecosystems (e.g., OCF, Zigbee, Z-Wave, Bluetooth, Fairhair) implement a certain Capability
- The goal is to achieve interoperability between connected things from different ecosystems

# Capability Shape

```
building:LevelCapability
  rdf:type sh:Shape ;
  sh:property [
    sh:hasValue iot:Common ;
    sh:nodeKind sh:IRI ;
    sh:predicate iot:domain ;
  ] ;
  sh:property [
    sh:nodeKind sh:IRI ;
    sh:predicate iot:providesInteractionPattern ;
    sh:maxCount 3 ;
    sh:minCount 3 ;
    sh:classIn (
      common:CurrentLevel
      common:SetLevel
      common:TransitionTime
    ) ;
  ].
```

# Interaction Pattern Shape

```
common:TransitionTime
  rdf:type sh:Shape ;
  rdfs:subClassOf <http://iot.schema.org/common#Property> ;
  sh:property [
    sh:class common:TransitionTimeData ;
    sh:maxCount 1 ;
    sh:minCount 1 ;
    sh:predicate iot:acceptsInputData ;
  ] ;
  sh:property [
    sh:class common:TransitionTimeData ;
    sh:maxCount 1 ;
    sh:minCount 1 ;
    sh:predicate iot:providesOutputData ;
  ] ;
.
```

# Data Type Shape

common:TransitionTimeData

  rdf:type sh:Shape ;

  sh:property [

    sh:class schema:Number ;

    sh:maxCount 1 ;

    sh:minCount 1 ;

    sh:nodeKind sh:IRI ;

    sh:predicate schema:propertyType ;

  ];

  sh:property [

    sh:hasValue "unit:SecondTime"^^xsd:anyURI ;

    sh:maxCount 1 ;

    sh:minCount 1 ;

    sh:predicate schema:unitCode ;

  ];

.