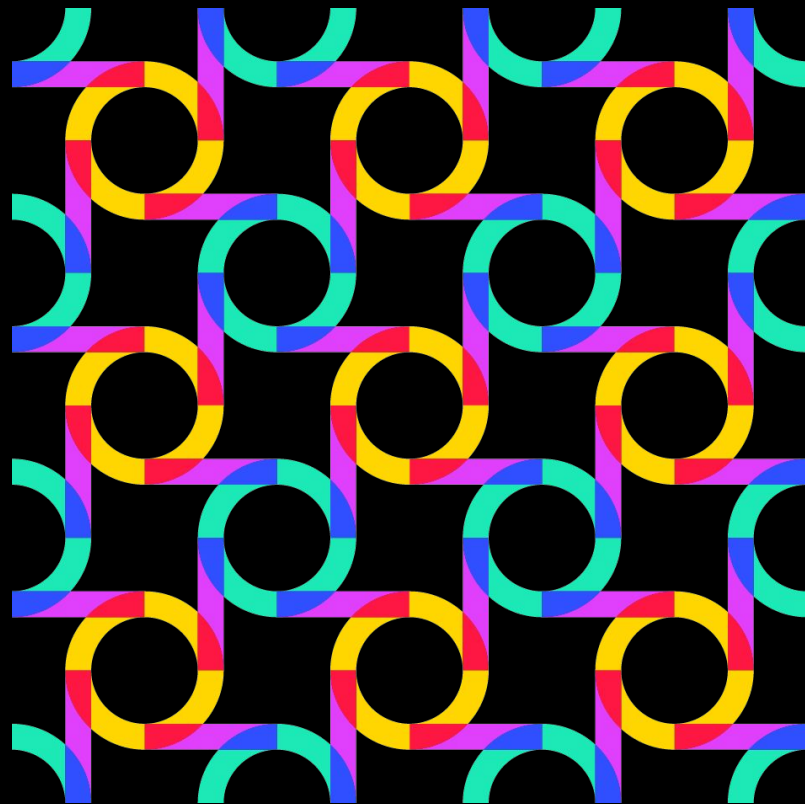


# Introduction to Smart Data Models

FIWARE Foundation  
Data Modelling Expert  
Alberto Abella



# Contents and goals

- About:
  - During this part of the session you will get introduced to the Smart Data Models initiative
- This session will:
  - Explain basics about the Smart Data Models initiative and how it is governed
  - Introduce you to data models for specific verticals that are already available
  - Explain how you may contribute extensions to existing data models under Smart Data Models
  - Explain how you may contribute new data models under Smart Data Models
- Goals:
  - After this session you will be able to implement a service using a Smart Data Model
  - You will be able to explain how to become an active contributor to the Smart Data Model initiative
- Target Audience:
  - LEBDs
- Link to the content

# Smart Data Models: Introduction and Governance

# Introduction and Governance

## Steering Board :

- Three members (April-2021)



- IUDX: Indian Urban Data Exchange
  - Public entity supporting data interchange for Smart cities in India



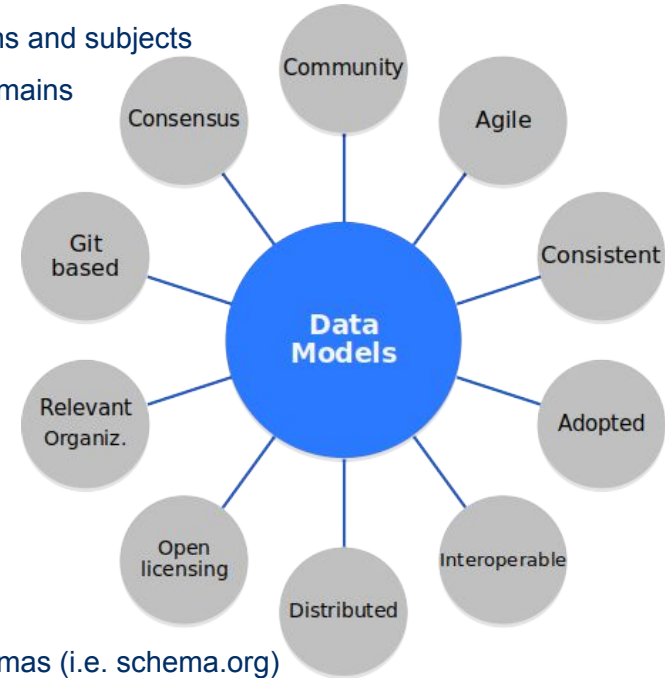
- TMForum:
  - Worldwide Telco association



- FIWARE Foundation
  - Curator of the open source FIWARE platform and its ecosystem

# Introduction and Governance

- A **community** site with **detailed data models** available for open use for multiple sectors
- Together with other **relevant organizations** in the curation of the different domains and subjects
- Providing **coherence and consistency** between data models across different domains
- To create a method for **AGILE standardization** and evolution these data models
- To provide extended usefulness to FIWARE platform users in terms of:
  - Extended **interoperability**
  - Reduced time dedicated to data model coding
  - Accumulated experience tested in real case scenarios
  - Mapped to be integrated with other platforms
- Using **open licensing** to allow extensive use and adoption
- Used in **real** case scenarios (and based on real use cases)
- Based on git platform and github as development frontend
- Consensus as main decision method
- Based on **widely adopted** standards (including ontologies and international schemas (i.e. schema.org))



# Introduction and Governance

## Differential advantages

1. **Agile standardization.** Standardization time takes  
Weeks vs months/years
2. **Easy contribution.** One single file source of truth.
3. **Based on actual experience.** All data models are  
based on real case scenario.
4. **Multilanguage.** Automation translation of specs.
5. **1 change for all domains.** Changing a data model  
impact on all the domains related to it.



By Pieter Brueghel the Elder - bAGKOdJfvfAhYQ at Google Cultural Institute, zoom level maximum, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=22178101>

Smart Data Models: Structure and contents. Verticals

# Smart Data Models: Structure and contents. Verticals

## ■ What is a Smart Data Model:

- It is the combination of 3 elements
  - A technical description of the data types and relationships of the attributes of an element that has to be modeled
  - A documented description of these attributes aligned with the technical description
  - Some examples of the use of the data model
- Based on real case scenario (not theory or academic research)
- With an open license allowing its use, share and modification

## ■ What is NOT a Smart Data Model

- It is not an ontology describing the elements of an area of knowledge
- A new standard
- An academic exercise



# Structure and contents. Verticals

## GITHUB

<http://github.com/smart-data-models>

The screenshot shows the GitHub repository for Smart Data Models. The repository is titled "Smart Data Models" and has a description: "Smart Data Models - FIWARE. TMForum. Further info at https://github.com/smart-data-models/data-models/blob/master/README.md More at http://smartdatamodels.org". The repository is categorized under "Repositories" with 44 items. It is pinned to the user's profile. The repository is described as an "Umbrella Repository for Data Models" and is used for the development of data models before PR to the right repository. It is a Python repository with 32 stars and 19 forks. Other pinned repositories include "harmonization", "Incubated", "SmartCities", "SmartAgridood", and "SmartWater".

- Oriented to **developers**
- All resources available
- [Contribution](#) by PR
- Issues on data models

## SITE (wp)

<http://smartdatamodels.org>

The screenshot shows the Smart Data Models website. The header includes links for "Contributor agreement", "Contact", "Submit an issue", "Learning zone", "Attributions", "How to use data models", and "Contribution Manual". The main navigation bar includes "Governance", "Submit data model", "Data models", "Subscribe", "About", and "News". The page title is "Smart Data Models" with the subtitle "An open initiative for agile data model standardization". The main content area has a heading "List of terms in data models" and a search bar. Below the search bar, there is a table with columns "name", "schema", "dataType", and "type". The table lists various data models and their schemas, data types, and types.

name	schema	dataType	type
Activity			
id	<a href="https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json">https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json</a>	object	Attribute
dateCreated	<a href="https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json">https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json</a>	string	Attribute
dateModified	<a href="https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json">https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json</a>	string	Attribute
source	<a href="https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json">https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json</a>	string	Attribute
name	<a href="https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json">https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json</a>	string	Attribute
alternataName	<a href="https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json">https://github.com/smart-data-models/dataModel.User/blob/master/Activity/schema.json</a>	string	Attribute

- Oriented to **end users**
- [News](#) on updates ([subscription](#))
- [Check attributes and enumerations](#)
- [Check descriptions](#)

# Structure and contents. Verticals

## DATA-MODELS

- Guides for coding new data models
- Template for new data models and examples
- Directory for scripting tools to check data models
- Inventory of domains and data models
- Inventory of attributes and terms



**data-models**  
Umbrella repo

## DOMAINS REPOSITORIES

Readme  
pointing to the  
list of subjects  
General info or  
shared  
resources



Smart  
Water

Smart  
Cities

Smart  
Environment

Smart  
Building

Smart  
Destinations

Smart  
Agrifood

Smart  
Robotics

Smart  
Manufacturing

Smart  
Energy

## DATA MODELS

README.md  
/doc/spec.md  
/examples  
schema.json  
Current Adopters



Subject 1  
(sewage)

Subject 2  
(parking)

Subject 3  
(weather)

Subject 4  
(...)



## SUBJECTS' REPOSITORIES

Readme pointing to the list of data models for the objects  
Contributors.md  
*subject*-schema.json

## LIFECYCLE MANAGEMENT REPOSITORIES

Incubated

Harmonization

# Structure and contents. Verticals

About: 554 data models available. Data Models per domain\*:

■ 'SmartEnergy':	414
■ 'SmartCities':	59
■ 'CrossSector':	33
■ 'SmartWater':	22
■ 'SmartAgrifood':	19
■ 'SmartEnvironment':	16
■ 'SmartDestination':	10
■ 'SmartAeronautics':	6
■ 'Smart-Sensoring':	4
■ 'SmartRobotics':	1

Last Subjects :

- dataModel.Forestry
- dataModel.SocialMedia,
- dataModel.WasteWater,
- dataModel.OPCUA,
- dataModel.OpenChannelManagement,
- dataModel.QueueManagement

\*Some subjects are linked to several domains so the # of data models exceeds the actual figure

\*\* ROS data models could mean > 100 data models

Updated 25-4-2021

# Structure and contents. Verticals

Incubated repository (They could end up being official data models or not):

Total estimated : 98 (+49)

In domains of:

SmartRobotics 53\* (not related to ROS)

SmartCities 12

SmartWater 11

























CrossSector 11

Smart-Sensoring 6

Smart Environment 3

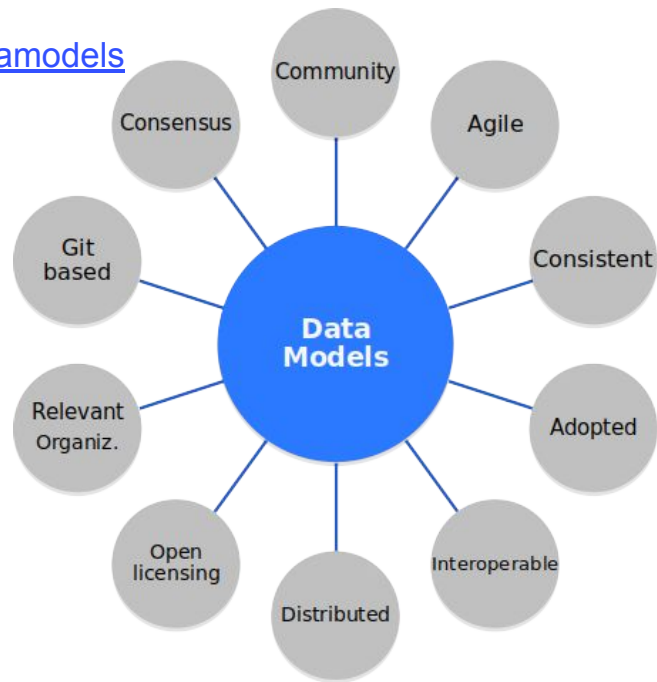
SmartAgrifood 1

Cross Sector 5

 BuildingType	 IoTDataModel
 CEF-project	 MLModels
 CulturalObjects	 NGSI-LD_validator
 DCAT-AP	 Node
 DIH2	 OPCUA
 DeviceOperation	 RawWaterManagement
 FleetVehicleOperation	 RiskAssessment
 FleetVehicleStatus	 SMB
 Floor	 SmartDestinations
 GS1_codes	 SmartMeteringObservation
 House	 TMFORUM
 IUDX	 TechnicalCabinetDevice

# Structure and contents. Verticals

- Services for users
  - [News](#), [subscription](#) to newsletter, and twitter account [@smartdatamodels](#)
  - [Search](#) data models
  - [Repositories](#) of data models, [quick list](#).
- Services for developers
  - [Checklist](#) for submitting your new data model
  - Create your data model [with a spreadsheet](#)
  - Create your data model in the [incubated repository](#)
  - [Create a examples](#) compliant with a data model (NGSI-LD)
  - [Validate](#) if your data model is well documented
  - [Validate your payload](#) (external)



# Structure and contents. Verticals

## ■ Contents:

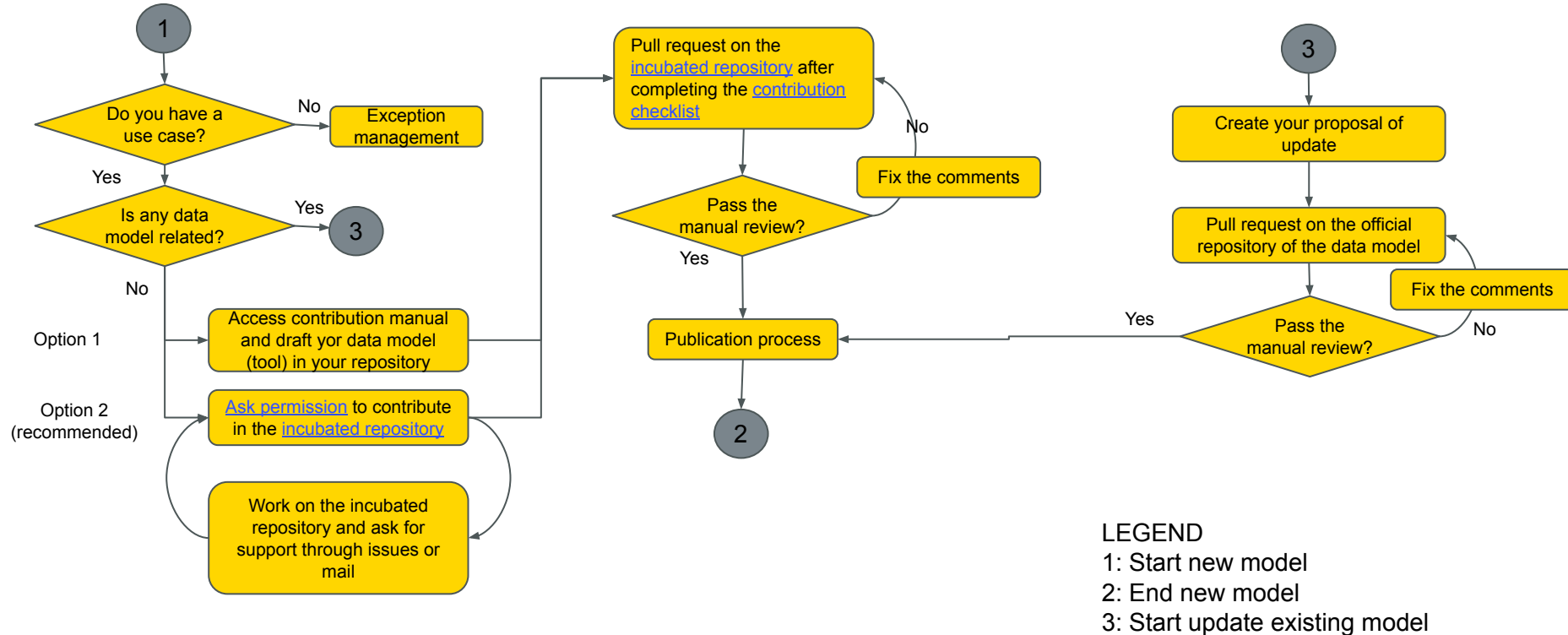
- *doc*: directory for specifications
- *examples* : Directory for examples
- *ADOPTERS.yaml* use cases of the data model
- *LICENSE.md* license of the data model. I.e. CC-BY
- *README.md* pointer to the main elements of the data model, including examples, specifications and other services
- *model.yaml* technical description of the attributes for embedding into the specifications
- *notes.yaml* additional file for customization contents for the specifications
- *schema.json* single source of truth of the model. Validates only the key-values payloads
- *swagger.yaml* yaml file required for the interactive specification and future test of services

■	doc
■	examples
■	ADOPTERS.yaml
■	LICENSE.md
■	README.md
■	model.yaml
■	notes.yaml
■	schema.json
■	swagger.yaml

- Mandatory
- Optional
- Automatic

Smart Data Models: Become a contributor.

# Smart Data Models: Become a contributor.





## Smart Data Models: Exercise

Turn a data source definition into a data model

# Exercise

- Expected knowledge from the participants
  - Knowledge of NGSI-v2 and NGSI-LD and their differences
  - Some work with a Context Broker (any of them)
  - JSON and JSON Schema
  - Git and GitHub concepts
  - A code editor like PyCharm

# Exercise

- It is required **your github users** to be written here ([http://bit.ly/github\\_users](http://bit.ly/github_users)) to grant you access to the incubated repository.
  - If you do not have a github user, then go here: [http://bit.ly/register\\_github](http://bit.ly/register_github)
- Use the repository incubated. <https://github.com/smart-data-models/incubated/tree/master>
- The final exercise is to **submit a complete data model**.
- Complete the creation of an official data model through all its steps.
- It will be done with official sources, so the result of the exercise, if completed, will become an official data model of the initiative.
- Comments to the contribution manual will be incorporated
- If not completed during session time It can be completed afterwards

# Become a contributor

## ■ Checklist for contribution

### SMART DATA MODELS

[Data models](#)[Governance](#)[Subscribe](#)[Draft a data model](#)[NGSI-LD Examples](#)[About](#)

#### Domains

Smart Cities	Smart Agrifood	Smart Water	Smart Energy
Smart Environment	Smart Robotics	Smart Sensing	Cross sector
Smart Aeronautics	Smart Destination		
Lifecycle repositories	Incubated	Harmonization	
Domains incubated	Smart Manufacturing		

### Shortcut to go or search your data model

20/04/2021

Cross Sector, Governance, Smart Cities domain, Smart Energy domain, Smart Environment domain, Smart Manufacturing domain, Smart Robotics domain, Smart Water Domain, Smart-Sensing domain, SmartAeronautics, SmartAgrifood domain, SmartDestinations

List of data models

#### Services for users

- Structured search
- Stats:
- 38 Subjects
- 552 data models
- Validate a payload with a data model
- Check your schema before contributing it
- Generate a NGSI-LD payload based on a Data Model
- Create a spec out your schema
- Contribution checklist
- Give your opinion about what is more relevant

#### schema.json

- 1.- ☐ Do you have a schema.json?
- 2.- ☐ Is the schema documented according to the contribution manual (Section 1)?  
Contribution manual
- 3.- ☐ Have you passed the schema checker? (see below)  
schema checker
- 4.- ☐ Have you checked the -don't do these- section in the contribution manual (Section 4)?  
Contribution manual

#### Examples

- 5.- ☐ Have you the 4 examples (NGSI and NGSI-LD, key-values and normalized each)?
- 6.- ☐ Have you checked the key-values validate against the schema with the validation tool?  
Validate example

#### Optional documents

- 7.- ☐ Do you want to be credited for your contribution?
- 8.- ☐ If yes, Are you including in your PR modifications to the contributors.yaml?
- 9.- ☐ Do you want to customize the specifications?
- 10.- ☐ If yes, Are you including in your PR modifications to the notes.yaml?

#### Contribution

- 11.- ☐ Have you signed the contribution agreement?  
Contribution Agreement

# Exercise

## Data sources

These data sources have dozens of properties. We'll only take a few for the exercise.

- <https://www.schema.org/MedicalCondition>
  - <https://www.schema.org/MedicalGuideline>
  - <https://www.schema.org/Drug>
  - <https://www.schema.org/MedicalScholarlyArticle>
  - <https://www.schema.org/LocalBusiness>
  - [\*\*https://www.schema.org/Organization\*\*](https://www.schema.org/Organization)
  - <https://www.schema.org/Restaurant>
- 
- Other available. <https://www.schema.org/docs/health-lifesci.home.html>

Take a minimum of 5 properties, one an object / array.

# Exercise

## Data sources

Other data sources could be valid as well as:

1. It has documented attributes
2. It has clear data types for the attributes
3. It is on use in some real case scenario

# Exercise

- Steps:
  1. Review the contribution manual
  2. Access to the data source
  3. Open our spreadsheet
  4. Paste the data definitions in the spreadsheet according to the contribution manual.
  5. Generate the json schema
  6. Validate the json schema
  7. Generate the example of payload
  8. Validate the example against the schema
  9. Submit the new data model

# Exercise

- Review the contribution manual
  1. Contribution manual is linked in the main page or in [https://bit.ly/contribution\\_manual](https://bit.ly/contribution_manual)

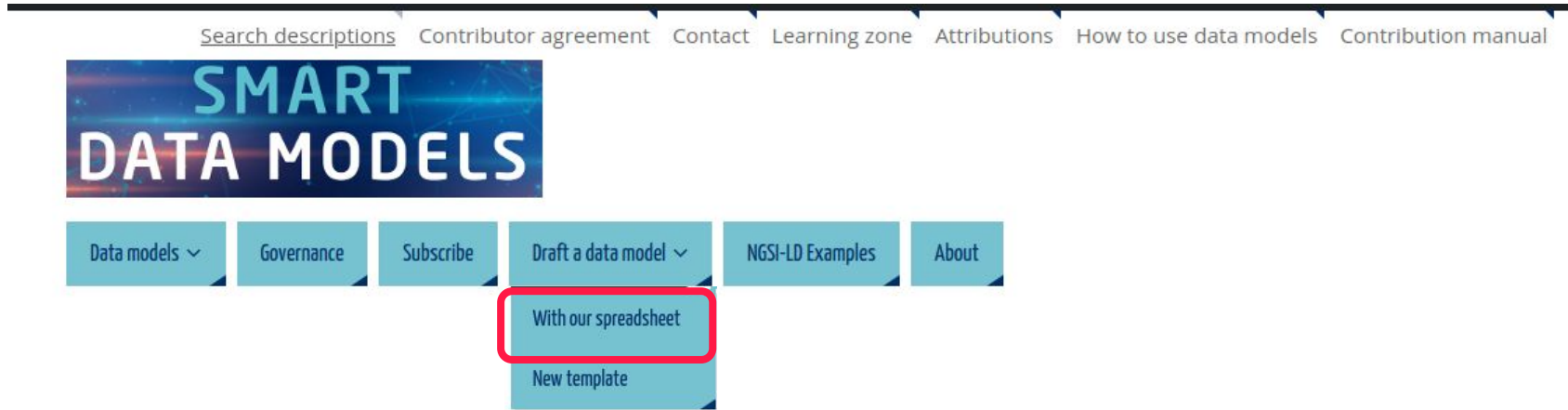


# Exercise

- Access to the data source. Examples available.
  - a. <https://www.schema.org/MedicalCondition>
  - b. <https://www.schema.org/MedicalGuideline>
  - c. <https://www.schema.org/Drug>
  - d. <https://www.schema.org/MedicalScholarlyArticle>
  - e. <https://www.schema.org/LocalBusiness>
  - f. <https://www.schema.org/Organization>
  - g. <https://www.schema.org/Restaurant>
  - h. <https://www.schema.org/docs/health-lifesci.home.html>

# Exercise

- Open our spreadsheet (need a google drive account)



# Exercise

- Paste the data definitions in the spreadsheet according to the [contribution manual](#).

Subject	name of the subject	<a href="#">This is the Subject where this data model should be included. Find in the link here the list of active data m</a>		
DataModel	DataModelName	Name of the entity of the data model. One word starting with capital letter		
Title	Data Model Name	Title of the json schema describing the entity		
Global description	Description of the data model	Text description of the entity (to be included into the json schema describing the data model)		
	This spreadsheet is freely modified on blue zones. When finished come back to the smartdatamodels site and click the button If you want to keep your data you have to make a copy			
<b>PROPERTIES</b>				
property name	NGSI-LD type	Data type	Other restrictions (not working yet)	Description
property1	Property	string		Description of the property 1
property2	Property	number		Description of the property 2
property3	Property	boolean		Description of the property 3
property4	Property	array		Description of the property 4
property5	Property	object		Description of the property 5

# Exercise

- Generate the json schema
  - Fix possible errors
  - Provide more detail / limits
  - Include Units
  - Include Enumerations
  - Include Privacy
  - Include limitations to values
  - Required Properties

```
$schema: "http://json-schema.org/schema#"
$schemaVersion: "0.0"
▼ $id: "https://smart-data-models.github.io/name of the subject/DataModelName/schema.json"
  title: " Smart Data Models - Data Model Name"
  description: "Description of the data model."
  type: "object"
▼ allOf:
  ▼ 0:
    ▼ $ref: "https://smart-data-models.github.io/data-models/common-schema.json#/definitions/GSMA-Commons"
  ▼ 1:
    ▼ $ref: "https://smart-data-models.github.io/data-models/common-schema.json#/definitions/Location-Commons"
  ▼ 2:
    ▼ properties:
      ▼ property1:
        type: "string"
        ▼ description: "Property. Model:'https://schema.org/Text'. Description of the property 1"
      ▼ property2:
        type: "number"
        ▼ description: "Property. Model:'https://schema.org/Number'. Description of the property 2"
      ▼ property3:
        type: "boolean"
        ▼ description: "Property. Model:'https://schema.org/Boolean'. Description of the property 3"
      ▼ property4:
        type: "array"
        description: "Property. Description of the property 4"
        items: {}
      ▼ property5:
        type: "object"
        description: "Property. Description of the property 5"
        properties: {}
      ▼ property6:
        type: "string"
        format: "date-time"
        ▼ description: "Property. Model:'https://schema.org/DateTime'. Description of the property 6"
```

# Exercise

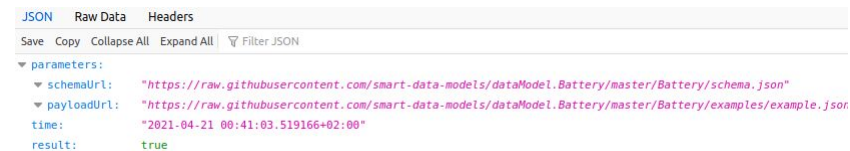
## ■ Validate the json schema

### ■ Validation of the json schema

<https://www.jsonschemavalidator.net/>

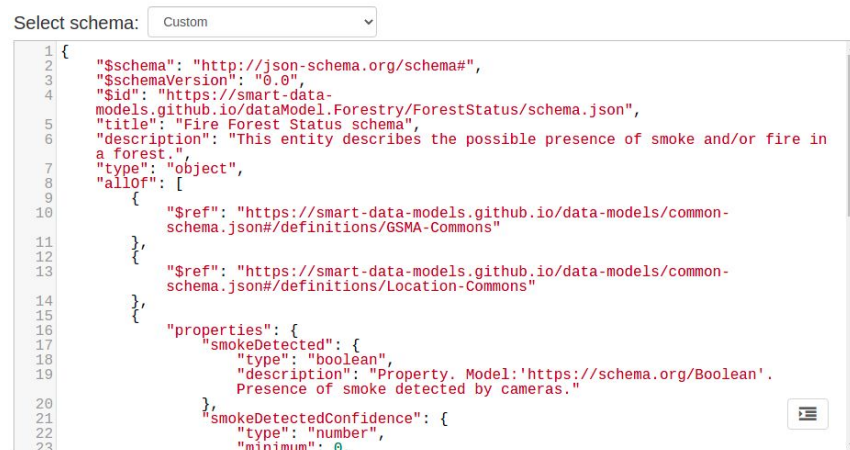
### ■ Validation of the documentation

<https://smartdatamodels.org/index.php/data-models-contribution-api/>



The screenshot shows a web-based JSON validation tool. It has tabs for 'JSON', 'Raw Data', and 'Headers'. Below the tabs are buttons for 'Save', 'Copy', 'Collapse All', 'Expand All', and a 'Filter JSON' dropdown. The main area displays the following JSON data:

```
▼ parameters:
  ▼ schemaUrl: "https://raw.githubusercontent.com/smart-data-models/dataModel.Battery/master/Battery/schema.json"
  ▼ payloadUrl: "https://raw.githubusercontent.com/smart-data-models/dataModel.Battery/master/Battery/examples/example.json"
time: "2021-04-21 00:41:03.519166+02:00"
result: true
```



The screenshot shows a web-based JSON validation tool. It has a 'Select schema:' dropdown menu set to 'Custom'. The main area displays a JSON document being validated against a schema. The JSON document is as follows:

```
1 {
2   "$schema": "http://json-schema.org/schema#",
3   "$schemaVersion": "0.0",
4   "$id": "https://smart-data-models.github.io/dataModel.Forestry/ForestStatus/schema.json",
5   "title": "Fire Forest Status schema",
6   "description": "This entity describes the possible presence of smoke and/or fire in a forest.",
7   "type": "object",
8   "allOf": [
9     {
10      "$ref": "https://smart-data-models.github.io/data-models/common-schema.json#/definitions/GSMA-Commons"
11    },
12    {
13      "$ref": "https://smart-data-models.github.io/data-models/common-schema.json#/definitions/Location-Commons"
14    },
15    {
16      "properties": {
17        "smokeDetected": {
18          "type": "boolean",
19          "description": "Property. Model:'https://schema.org/Boolean', Presence of smoke detected by cameras."
20        },
21        "smokeDetectedConfidence": {
22          "type": "number",
23          "minimum": 0.
```

✓ No errors found. JSON validates against the schema

# Exercise

- Generate the normalized example of payload
  - I.e. NGSI-LD is available
- Needs edit for meaningful data



JSON	Raw Data	Headers
Save	Copy	Collapse All Expand All Filter JSON
id:		
"urn:ngsi-ld:StreetLightModel:id:NYEG:63921792"		
▼ dateCreated:		
type:		
"Property"		
▼ value:		
@type:		
"DateTime"		
@value:		
"2018-03-28T16:16:36Z"		
▼ dateModified:		
type:		
"Property"		
▼ value:		
@type:		
"DateTime"		
@value:		
"2018-05-04T15:59:29Z"		
▼ source:		
type:		
"Property"		
▼ value:		
"Experience dark cup none alone. Southern official east mission benefit. Follow bar focus blood."		
▼ name:		
type:		
"Property"		
▼ value:		
"Third smile public three share. Close third less maybe prove."		
▼ alternateName:		
type:		
"Property"		
▼ value:		
"Develop voice bit entire forget. Whose finally option baby modern. Describe fall nor by can. Indicat		
▼ description:		
type:		
"Property"		
▼ value:		
"Suffer air debate mission this leader. Identify moment treatment tonight. Notice young trouble telev		
▼ dataProvider:		
type:		
"Property"		
▼ value:		
"Candidate other candidate blood may let world. Base when people better reason task follow many. Stat		
▼ owner:		
type:		
"Property"		
▼ value:		
0:		
"urn:ngsi-ld:StreetLightModel:items:SD0Y:46616655"		
1:		
"urn:ngsi-ld:StreetLightModel:items:EAB0:19562265"		

# Exercise

- Generate the key-values of payload
  - Use the script or manually with your code editor



JSON	Raw Data	Headers
Save	Copy	Collapse All Expand All Filter: JSON
Id: "urn:ngsi-ld:StreetLightModel:id:NYEG:63921792"		
▼ dateCreated:	"Property"	
type:	"Property"	
▼ value:	"DateTime"	
@type:	"DateTime"	
@value:	"2018-03-28T16:16:36Z"	
▼ dateModified:	"Property"	
type:	"Property"	
▼ value:	"DateTime"	
@type:	"DateTime"	
@value:	"2018-05-04T15:59:29Z"	
▼ source:	"Property"	
type:	"Property"	
▼ value:	"Experience dark cup none alone. Southern official east mission benefit. Follow bar focus blood."	
name:	"Property"	
type:	"Property"	
▼ value:	"Third smile public three share. Close third less maybe prove."	
▼ alternateName:	"Property"	
type:	"Property"	
▼ value:	"Develop voice bit entire forget. Whose finally option baby modern. Describe fall nor by can. Indicat"	
▼ description:	"Property"	
type:	"Property"	
▼ value:	"Suffer air debate mission this leader. Identify moment treatment tonight. Notice young trouble telev"	
▼ dataProvider:	"Property"	
type:	"Property"	
▼ value:	"Candidate other candidate blood may let world. Base when people better reason task follow many. Stat"	
▼ owner:	"Property"	
type:	"Property"	
▼ value:	"urn:ngsi-ld:StreetLightModel:items:SDOY:46616655"	
0:	"urn:ngsi-ld:StreetLightModel:items:EABO:19562265"	
1:		

# Exercise

- Validate the payload (keyvalues). <https://www.jsonschemavalidator.net/>

Select schema: Custom

```
1 {
2   "$schema": "http://json-schema.org/schema#",
3   "$schemaVersion": "0.0",
4   "$id": "https://smart-data-
5     models.github.io/dataModel.Forestry/ForestStatus/schema.json",
6   "title": "Fire Forest Status schema",
7   "description": "This entity describes the possible presence of smoke and/or fire in
8     a forest.",
9   "type": "object",
10  "allOf": [
11    {
12      "$ref": "https://smart-data-models.github.io/data-models/common-
13        schema.json#/definitions/GSMA-Commons"
14    },
15    {
16      "$ref": "https://smart-data-models.github.io/data-models/common-
17        schema.json#/definitions/Location-Commons"
18    },
19  ],
20  "properties": {
21    "smokeDetected": {
22      "type": "boolean",
23      "description": "Property. Model:'https://schema.org/Boolean'.
24        Presence of smoke detected by cameras."
25    },
26    "smokeDetectedConfidence": {
27      "type": "number",
28      "minimum": 0.
29    }
30  }
```

✓ No errors found. JSON validates against the schema

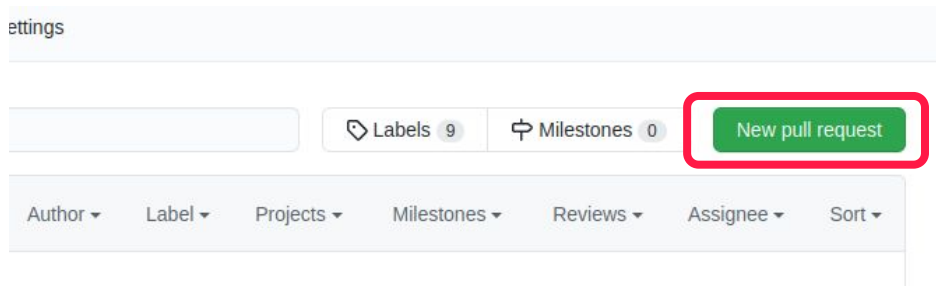
Input JSON:

```
1 {
2   "id": "FireForestStatus-South-1",
3   "dateObserved": "2021-02-24T00:00:00Z",
4   "location": {
5     "type": "Point"
6     "coordinates": [42.206302, -7.887465]
7   },
8   "name": "Ourense Forest - South",
9   "description": "Status of the Ourense Forest (south)",
10  "refDevice": {
11    "type": "Relationship",
12    "object": ["ground-humidity-sensor:1"]
13  },
14  "smokeDetected": false,
15  "smokeDetectedConfidence": 0.9,
16  "fireDetected": false,
17  "fireDetectedConfidence": 0.8,
18  "fireRiskIndex": 0.1,
19  "litterCoverage": 0.6,
20  "relativeHumidity": 0.70,
21  "soilTemperature": 25
22 }
```



# Exercise

- Fork the incubated repository
- PR your changes to the data model



They will appear in the front page in 5 minutes maximum (right column, bottom)

## PR and issues

updated every 5 minutes (if empty, it means we are updating, please refresh)

dataModel.WasteManagement  
WasteContainer  
(storedWasteKind) enum, other values?

dataModel.Transportation  
remove minimum from  
amperage and voltage

dataModel.Battery  
Possible inconsistency in  
rechargeTime attr

dataModel.AutonomousMobileRobot  
Added robotics data models  
for autonomous mobile  
robots  
incubated  
commit  
added smb to OrionBroker  
dataModel.SocialMedia  
Pull request to fix  
inconsistencies

## Smart Data Models: Summary

# Summary

- Goal
  - Allow real interoperability between NGS data sources
- Contribution:
  - Always possible as long as it has a use case, and comply with contribution workflow
- Use of the data models
  - Search tools for finding the right data model
  - Best not to reinvent the wheel
- Differential advantages of agile standardization
  - Quick answer
  - Do not invent
  - Easy contribution
  - Single source of truth
  - Better simple and useful than technically 'correct' and powerful

# Thank you!

