Version 1.0 - DRAFT

July 26, 2016

Prepared by:

luis garnica CHAVIRA

SMART CITIES LIVING LAB SENSOR NETWORK

Data Model View

Architecture document

Contents

[Data Model View 2](#_Toc457313545)

[Primary Representation 2](#_Toc457313546)

[Database Catalog 2](#_Toc457313547)

[DEVICE 2](#_Toc457313548)

[WEEKDATASET 5](#_Toc457313549)

# Data Model View

This document describes the base schema to store device, sensor and sensor measurement data for the Smart Cities Living Lab at UDG.

## Catalog

The database consists of 2 annotated JSON collections: devices and weekly datasets. Fields marked in green are considered an index field.

### DEVICE

This collection metadata information regarding a device (controller boards) and the sensing devices attached to each board.

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Type | Semantic Context | Description |
| @id | xsd:string | ssn:Device | A device is a physical piece of technology - a system in a box. Devices may of course be built of smaller devices and software components (i.e. systems have components). |
| boardName | xsd:string | scllv-meta:board | Board name of the device. |
| assembledBy | xsd:string | scllv-meta:assembledBy | Name of the person responsible for putting together or assembling a device. |
| serialNumber | xsd:string | scllv-meta:serialNumber | A unique identifier assigned incrementally or sequentially to an item. |
| macAddress | xsd:string | scllv-meta:macAddress | A unique identifier assigned to network interfaces for communications on the physical network segment. |
| protocol | xsd:string | scllv-meta:protocol | Is a system of rules that allow two or more entities of a communications system to transmit information via any kind of variation of a physical quantity. |
| datasheet | xsd:AnyURI | ssn:SensorDataSheet | A data sheet records properties of a sensor. A data sheet might describe for example the accuracy in various conditions, the power use, the types of connectors that the sensor has, etc. |
| admin | Object container | vcard:Individual | An object representing a single person or entity. |
| admin.name | xsd:string | vcard:hasName | To specify the components of the name of the object |
| admin.email | xsd:string | vcard:hasEmail | To specify the electronic mail address for communication with the object the vCard represents. |
| coll\_location | Object container | vcard:Location | An object representing a named geographical place |
| coll\_location.country | xsd:string | vcard:hasCountryName | Used to support property parameters for the country name data property. |
| coll\_location.location | xsd:string | dul:hasLocation | A generic, relative spatial location, holding between any entities. |
| coll\_location.latitude | xsd:double | geo:lat | The WGS84 latitude of a SpatialThing (decimal degrees). |
| coll\_location.longitude | xsd:double | geo:long | The WGS84 longitude of a SpatialThing (decimal degrees). |
| sensors | Object array | ssn:SensingDevice | A sensing device is a device that implements sensing. |
| sensors.partName | xsd:string | scllv-meta:partName | A word that names a part of a larger whole. |
| sensors.characteristic | xsd:string | isweb:Characteristic | A measured characteristic of an entity. Eg. Air temperature. |
| sensors.type | xsd:string | scllv-meta:deviceType | Signal type used by a sensing device (analog or digital) |
| sensors.entity | xsd:string | obo:BFO\_0000001 | An entity is anything that exists or has existed or will exist. |
| Sensors.datasheet | xsd:AnyURI | ssn:SensorDataSheet | A data sheet records properties of a sensor. A data sheet might describe for example the accuracy in various conditions, the power use, the types of connectors that the sensor has, etc. |
| Sensors.installdate | xsd:date | dc:date | Sensor installation date. |
| variable | Object array | ssn:MeasurementProperty | An identifiable and observable characteristic of a sensor's observations or ability to make observations. |
| Variable.characteristic | xsd:string | isweb:Characteristic | A measured characteristic of an entity. Eg. Air temperature. |
| Variable.unit | xsd:string | iot:Unit | the Unit of measure the value uses |
| Variable.valMin | xsd:string | iot:minimum | if a number or integer, the minimum value |
| Variable.valMax | xsd:string | iot:maximum | if a number or integer, the maximum value |
| Variable.frequency | xsd:integer | scllv: frequency | Measurements per minute. |

#### Namespaces

"scllv" : "http://ontology.cybershare.utep.edu/smart-cities/scllv#",

"scllv-meta" : "http://ontology.cybershare.utep.edu/smart-cities/scllv-meta#",

"xsd" : "http://www.w3.org/2001/XMLSchema#",

"rdfs": "http://www.w3.org/2000/01/rdf-schema#",

"owl": "http://www.w3.org/2002/07/owl#",

"dc" : "http://purl.org/dc/elements/1.1/",

"isweb" : "http://ontology.cybershare.utep.edu/ELSEWeb/elseweb-data.owl#",

"vcard": "http://www.w3.org/2006/vcard/ns#",

"geo" : "http://www.w3.org/2003/01/geo/wgs84\_pos#",

"dul" : "http://www.loa-cnr.it/ontologies/DUL.owl#",

"ssn" : "http://purl.oclc.org/NET/ssnx/ssn#",

"iot": "https://iotdb.org/pub/iot#",

"obo" : "http://purl.obolibrary.org/obo/",

"dcat" : "http://purl.org/ctic/dcat#",

#### Document Sample

{

"@context": "http://ontology.cybershare.utep.edu/smart-cities/scllv.jsonld",

"@id": "56b3a9d27de952005f38a69b",

"@type": "ssn:Device",

"boardName": "GalileoV2",

"assembledBy": "Gustavo",

"serialNumber": "FZGL40701DN7",

"macAddress": "98:4f:ee:00:e1:a6",

"protocol": "MQTT",

"datasheet": "http://www.intel.com/newsroom/kits/quark/galileo/pdfs/Intel\_Galileo\_Datasheet.pdf",

"admin": {

"@type": "vcard:Individual",

"name": "Ana Sofía Jáuregui Cuevas",

"email": "anasofia\_ja@hotmail.com"

},

"coll\_location": {

"@type": "vcard:Location",

"country": "mexico",

"location": "Innovation Center Floor 2",

"latitude": 20.7440479999999990,

"longitude": -103.3785491999999900

},

"sensors": [{

"@id": "577f10f29494f235d7f2b49b",

"@type": "ssn:SensingDevice",

"partName": "TSL2561",

"characteristic": "luminosity",

"type": "digital",

"entity": "environment",

"datasheet": "https://cdn-shop.adafruit.com/datasheets/TSL2561.pdf",

"installDate": "2012-04-23T18:25:43.511Z",

"variable": [{

"@type": "ssn:MeasurementProperty",

"characteristic": "light",

"unit": "Lumens",

"valMin": 0,

"valMax": 5047,

"frequency": 1

}]

}]

}

### WEEKDATASET

This collection concatenates stored sensing measurements per week.

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Type | Semantic Context | Description |
| @id | xsd:string | prov:Activity | Something that occurs over a period of time and acts upon or with entities |
| label | xsd:string | rdfs:label | Used to provide a human-readable version of a resource's name. |
| StartDate | xsd:dateTime | prov:startedAtTime | Start is when an activity is deemed to have been started by an entity, known as trigger. |
| EndDate | xsd:dateTime | prov:endedAtTime | End is when an activity is deemed to have been ended by an entity, known as trigger. The activity no longer exists after its end. |
| dataset | Object array | dcat:Dataset | A collection of data, published or curated by a single agent, and available for access or download in one or more formats. |
| dataset.date | xsd:dateTime | dc:date | Date and time of taken measurement. |
| dataset.light | xsd:string | scllv:light | Numeric light value measured in lumens by a light sensor. |
| dataset.noise | xsd:string | scllv:noise | Numeric noise value measured in decibels by a microphone sensor. |
| dataset.temperature | xsd:string | scllv:temperature | Numeric temperature value measured in celsius by a temperature sensor. |
| datase.pressure | xsd:string | scllv:pressure | Numeric pressure value measured un Kilo Pascal by a barometer sensor |
| dataset.wasgeneratedby | xsd:string | ssn:SensingDevice | A sensing device is a device that implements sensing. |

#### Namespaces

"scllv" : "http://ontology.cybershare.utep.edu/smart-cities/scllv#",

"xsd" : "http://www.w3.org/2001/XMLSchema#",

"rdfs": "http://www.w3.org/2000/01/rdf-schema#",

"dc" : "http://purl.org/dc/elements/1.1/",

"prov" : "http://www.w3.org/ns/prov#",

"ssn" : "http://purl.oclc.org/NET/ssnx/ssn#",

#### Document Sample

{

"@context": "http://ontology.cybershare.utep.edu/smart-cities/scllv.jsonld",

"@id" : "2d117ce2-4481-11e6-beb8-9e71128cae77",

"@type" : "prov:Activity",

"label": "Weekly Livinglab Sensing Activity",

"StartDate" : "2016-07-06T19:04:44.000Z",

"EndDate" : "2016-07-06T19:04:44.000Z",

"dataset": [

{

"@type": "prov:Entity",

"date": "2016-07-06T18:47:54Z",

"light": "7",

"wasgeneratedby" : "577f10f29494f235d7f2b49b"

},

{

"@type": "prov:Entity",

"date": "2016-07-06T18:47:54Z",

"noise": "23.46",

"wasgeneratedby" : "577f11019494f235d7f2b49c"

},

{

"@type": "prov:Entity",

"date": "2016-07-06T18:47:58Z",

"temperature": "29.49",

"wasgeneratedby" : "577f11069494f235d7f2b49d"

},

{

"@type": "prov:Entity",

"date": "2016-07-06T18:47:58Z",

"pressure": "85.35",

"wasgeneratedby" : "577f11069494f235d7f2b49d"

}

]

}