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SMART CITIES LIVING LAB SENSOR NETWORK

DATA MODEL VIEW

ARCHITECTURE DOCUMENT

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DATA MODEL VIEW

This document describes the base schema to store device, sensor and weekly 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 stores 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 Spatial Thing (decimal degrees).
coll_location.longitude	xsd:double	geo:long	The WGS84 longitude of a Spatial Thing (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.name	xsd:string	vcard:hasName	To specify the components of the name of the object.
sensors.type	xsd:string	scllv-meta:deviceType	Signal type used by a sensing device (analog or digital)
sensors.entity	xsd:string	oboe:Entity	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.ontologydesignpatterns.org/ont/dul/DUL.owl#
ssn : http://purl.oclc.org/NET/ssnx/ssn#
iot: https://iotdb.org/pub/iot#
oboe : http://ecoinformatics.org/oboe/oboe.1.1/oboe-core.owl#
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",
		"name": "light sensor",
		"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 on a weekly basis.

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.

dataset.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"
```