

SensorThings API

Overview

Interface for Internet of Things

Demo Server and examples

- Demo From SensorUp
- Link: <http://toronto-bike-snapshot.sensorup.com/v1.0/>
- Behaves like a GetCapabilities.
- Provides URLs to interrogate further the service

Return Base Resource Path

<http://toronto-bike-snapshot.sensorup.com/v1.0/>

```
{
  "value": [
    {
      "name": "Things",
      "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/Things"
    },
    {
      "name": "Locations",
      "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/Locations"
    },
    {
      "name": "HistoricalLocations",
      "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/HistoricalLocations"
    },
    {
      "name": "Datastreams",
      "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/Datastreams"
    },
  ],
}
```

Return Base Resource Path (Cont)

```
{
  "name": "Sensors",
  "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/Sensors"
},
{
  "name": "Observations",
  "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/Observations"
},
{
  "name": "ObservedProperties",
  "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/ObservedProperties"
},
{
  "name": "FeaturesOfInterest",
  "url": "http://pm25-march.singapore2017.sensorup.com/v1.0/FeaturesOfInterest"
}
]
```

Which *Things* are available in the server?

<http://toronto-bike-snapshot.sensorup.com/v1.0/Things>

```
{
"@iot.count":199,
"@iot.nextLink":"http://toronto-bike-snapshot.sensorup.com/v1.0/
  Things?$stop=100&$skip=100",
"value":[
  {
    "@iot.id":206047,
    "@iot.selfLink":"http://toronto-bike-snapshot.sensorup.com/v1.0/Things(206047)",
    "description":"Bloor St / Brunswick Ave Toronto bike share station with data
      of available bikes and available docks",
    "name":"7061:Bloor St / Brunswick Ave",
    "properties":{

  },
  ...
]
```

Getting a *Datastream* for a thing

[http://toronto-bike-snapshot.sensorup.com/v1.0/Things\(206047\)/Datastreams](http://toronto-bike-snapshot.sensorup.com/v1.0/Things(206047)/Datastreams)

```
{
  "@iot.count":2,
  "value":[
    {
      "@iot.id":206051,
      "@iot.selfLink":
        "http://toronto-bike-snapshot.sensorup.com/v1.0/Datastreams(206051)",
      "description":
        "... available docks count for the Toronto bike share station Bloor St ",
      "name":"7061:Bloor St / Brunswick Ave:available_docks",
      "observationType":
        "http://www.opengis.net/def/observationType/OGC-OM/2.0/OM_CountObservation",
      "unitOfMeasurement":{
        "symbol":"{TOT}",
        "name":"dock count",
        "definition":"http://unitsofmeasure.org/ucum.html#para-50"
      },
    },
    ....
  ]
}
```

Note: Datastreams define the unit of measurement

```
"observationType":  
  "http://www.opengis.net/def/observationType/OGC-OM/2.0/OM_CountObservation",  
"unitOfMeasurement": {  
  "symbol": "{TOT}",  
  "name": "dock count",  
  "definition": "http://unitsofmeasure.org/ucum.html#para-50"  
},
```


Getting the *Observations* related to a stream

[http://toronto-bike-snapshot.sensorup.com/v1.0/Datastreams\(206051\)/Observations](http://toronto-bike-snapshot.sensorup.com/v1.0/Datastreams(206051)/Observations)

```
{
  "@iot.count": 3511,
  "@iot.nextLink":
    "http://toronto-bike-snapshot.sensorup.com/...",
  "value": [
    {
      "@iot.id": 1595467,
      "@iot.selfLink":
        "http://toronto-bike-snapshot.sensorup.com/v1.0/Observations(1595467)",
      "phenomenonTime": "2017-02-16T21:55:12.233Z",
      "result": "23",
      "resultTime": null,
      "DataStream@iot.navigationLink":
        "http://toronto-bike-snapshot.sensorup.com/v1.0/Observations(1595467)/DataStream",
      "FeatureOfInterest@iot.navigationLink":
        "http://toronto-bike-snapshot.sensorup.com/v1.0/Observations(1595467)/FeatureOfInterest"
    }
  ],
}
```

Complex Query

- Expands Datastreams and observations in one query
- Feature of Interest = 7000:Ft. York / Capreol Crt.
- Start time = 2017-01-01T11:30:00.000Z
- End time = 2017-03-01T11:30:00.000Z

Link

```
http://toronto-bike-snapshot.sensorup.com/v1.0/Things?  
$expand=Datastreams/Observations/FeatureOfInterest&  
$filter=Datastreams/Observations/FeatureOfInterest/  
name eq '7000:Ft. York / Capreol Crt.' and  
Datastreams/Observations/phenomenonTime ge 2017-01-01T11:30:00.000Z  
and  
Datastreams/Observations/phenomenonTime le 2017-03-01T11:30:00.000Z
```

Complex Query Response

```
{
  "@iot.count":1,
  "value":[
    {
      "@iot.id":5,
      "@iot.selfLink":"http://toronto-bike-snapshot.sensorup.com/v1.0/Things(5)",
      "description":
        "Ft. York / Capreol Crt. Toronto bike share station available bikes and docks",
      "name":"7000:Ft. York / Capreol Crt.",
      "properties":{

    },
    "Datastreams":[
      {
        "@iot.id":9,
        "@iot.selfLink":"http://toronto-bike-snapshot.sensorup.com/v1.0/Datastreams(9)",
        "description":
          "...available docks count for the Toronto bike share station Ft. York / Capreol Crt.",
        "name":"7000:Ft. York / Capreol Crt.:available_docks",
        "observationType":
          "http://www.opengis.net/def/observationType/OGC-OM/2.0/OM_CountObservation",
        "unitOfMeasurement":{
          "symbol":"{TOT}",
          "name":"dock count",
          "definition":"http://unitsofmeasure.org/ucum.html#para-50"
        }
      }
    ]
  }
}
```

Complex Query Response (cont)

```
"Observations@iot.nextLink":  
    ".../v1.0/Datastreams(9)/Observations?$top=100&$skip=100",  
"Observations": [  
    {  
        "@iot.id": 1595545,  
        "@iot.selfLink": "http://toronto-bike-snapshot.sensorup.com/v1.0/Observations(1595545)",  
        "phenomenonTime": "2017-02-16T21:55:12.797Z",  
        "result": "10",  
        "resultTime": null,  
        "Datastream@iot.navigationLink":  
            ".... /v1.0/Observations(1595545)/Datastream",  
        "FeatureOfInterest": {  
            "@iot.id": 10,  
            "@iot.selfLink": "http://toronto-bike-snapshot.sensorup.com/v1.0/FeaturesOfInterest(10)",  
            "description": " ...
```