



# Connector for O-MI/O-DF data visualisation in Grafana

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- IoT data stored in O-MI Nodes in O-DF format
  - ◆ Potentially coming from different sources
  - ◆ Addressing different use cases
  - ◆ Accessible using the O-MI web app GUI
  - ◆ Queryable using O-MI messages

# Problem

- Creation of context-sensitive dashboards for IoT data visualisation with a tool that is:
  - ◆ Open source
  - ◆ Easy to configure
  - ◆ Capable of querying any O-DF object stored in an O-MI server
  - ◆ Supporting professionals interested in monitoring and controlling sensorised entities to make analysis on IoT data.

# Solution

- Creation of a connector for an
  - ◆ Open source platform
  - ◆ Out Of The Box tool
  - ◆ Fully customizable
  - ◆ Widely used for visualization and monitoring purposes




# How it works (1/2)

- Each panel or graph in Grafana connects to a specific Datasource
- The connection specifications are contained in a plugin, made of:
  - ◆ Datasource (Required): the javascript object that communicates with the database and transforms data to times series;and 3 other components required for visualization:
  - ◆ QueryCtrl (Required);
  - ◆ ConfigCtrl (Required);
  - ◆ AnnotationsQueryCtrl.
- A specific O-MI plugin has been created and made available to the Grafana community


# How it works (2/2)

- The user can create a Datasource pointing to a specific O-MI server using the O-MI plugin
- A configurable O-DF XML query is sent, using the Datasource, to the O-MI node
- Data is processed by the plugin and shown in a customizable widget



# Datasource configuration

 **Data Sources / New**  
Type: O-MI Server


Settings

Name	My O-MI Datasource		Default	<input type="checkbox"/>
Type	O-MI Server			

HTTP

URL	http://my.omi.server.ex	
Access	direct	

Auth

Basic Auth	<input type="checkbox"/>	With Credentials		<input type="checkbox"/>
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**Save & Test** Back

# Query configuration (1/2)

3 parameters:

- XML Query

- ◆ the XML query that is generated using the O-MI Server web interface.

- Object Type

- ◆ The type of the O-DF Objects to collect from the response

- Table columns structure

- ◆ JSON definition to populate the Table Panel



# Query configuration (2/2)

Table    General    **Metrics**    Options    Column Styles    Time range

Data Source: Grand Lyon O-MI Server

**A** OMI XML Query

```
<omiEnvelope
xmlns="http://www.opengroup.org/xsd/omi/1.0/"
version="1.0" ttl="0">
  <read msgformat="odf">
    <msg>
      <Objects
xmlns="http://www.opengroup.org/xsd/odf/1.0/">
        <Object>
          <id>Organization:Hydrasol:v0-1-0</id>
        <Object>
          <id>Deployment:PEPIPIAF:162419dd-13f6-43ac-
80e8-9c07f3d9ec3c</id>
        </Object>
      </Object>
    </Objects>
  </msg>
</read>
</omiEnvelope>
```

**B** Add Query

ODF Object Type: seas:SigFoxCommunicationDevice

Column definition

```
[
{
  "text": "Sensor",
  "type": "text",
  "path": "id.#text"
},
{
  "text": "Latitude",
  "type": "double",
  "path": "InfoItem[0].value.#text"
},
{
  "text": "Longitude",
  "type": "double",
  "path": "InfoItem[1].value.#text"
},
{
  "text": "Air temperature",
  "type": "number"
```

# BOTTLE TANKS MONITORING FOR BIOTOPE IN LYON

A concrete example

# Plugin selection

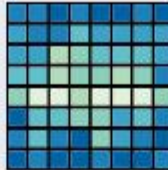
DATASOURCE



Graphite

By Grafana Project

PANEL



Heatmap

By Grafana Project

DATASOURCE



HxDal

By Holonix S.r.l.

DATASOURCE



InfluxDB

By Grafana Project

DATASOURCE



MySQL

By Grafana Project

DATASOURCE



O-MI Node plugin

By Holonix S.r.l.

DATASOURCE



OpenTSDB

By Grafana Project

PANEL



Plugin list

By Grafana Project

DATASOURCE




PostgreSQL

By Grafana Project

# Grand Lyon O-MI Server



 **Data Sources / Grand Lyon O-MI Server**  
Type: O-MI Node plugin

Settings

Name	Grand Lyon O-MI Server	<input type="checkbox"/>
Type	O-MI Node plugin	

HTTP

URL	https://biotope-omi.alpha.grandlyon.com	<input type="checkbox"/>
Access	direct	<input type="checkbox"/>

Auth

Basic Auth	<input type="checkbox"/>	With Credentials	<input type="checkbox"/>
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**Save & Test** **Delete** Back

# Query (metrics) parameters



Table    General    **Metrics**    Options    Column Styles    Time range

Data Source    Grand Lyon O-MI Server

**A**    OMI XML Query

```
<omiEnvelope
xmlns="http://www.opengroup.org/xsd/omi/1.0/"
version="1.0" ttl="0">
  <read msgformat="odf">
    <msg>
      <Objects
xmlns="http://www.opengroup.org/xsd/odf/1.0/">
        <Object>
          <id>Organization:Hydrasol:v0-1-0</id>
        <Object>
          <id>Deployment:PEPIPIAF:162419dd-13f6-43ac-
80e8-9c07f3d9ec3c</id>
        </Object>
      </Objects>
    </msg>
  </read>
</omiEnvelope>
```

**B**    Add Query

ODF Object Type

seas:SigFoxCommunicationDevice

Column definition










```
[
{
  "text": "Sensor",
  "type": "text",
  "path": "id.#text"
},
{
  "text": "Latitude",
  "type": "double",
  "path": "InfoItem[0].value.#text"
},
{
  "text": "Longitude",
  "type": "double",
  "path": "InfoItem[1].value.#text"
},
{
  "text": "Air temperature",
  "type": "number"
```

# Data visualization

O-MI ▾

Organization:Hydrasol:v0-1-0 ▾

Sensor ▾	Latitude	Longitude	Air temperature	Time
Sensor:1AD92D	45.76354	4.85139	29	2018-09-21 15:29:55
Sensor:1AD864	45.76113	4.85182	29.5	2018-09-21 15:29:32
Sensor:1AD852	45.75934	4.85216	22	2018-09-21 15:29:31
Sensor:1AD80F	45.76031	4.85199	29	2018-09-21 15:29:24

        Last 6 hours 

i Organization:SigrenEa-V1.1.0

SerialNumber	AvgFillingRatePerDay	FillingLimit	FillingRate	MaxCapacity	Time ▾
180	1	100	21	2500	2018-07-17 16:57:50
297	3	100	51	2000	2018-07-17 16:57:50
119	2	100	28	2500	2018-07-17 16:57:50
294	1	100	100	2150	2018-07-17 16:57:50
295	1	100	70	2500	2018-07-17 16:57:50
291	1	100	0	2000	2018-07-17 16:57:50
293	2	100	35	2150	2018-07-17 16:57:50
290	1	100	0	2150	2018-07-17 16:57:50
292	2	100	42	2150	2018-07-17 16:57:50

1 2 3 4 5 6 7 8 9

# THANKS

More info at [grafana-o-mi-server-connector on GitHub](#)