1. VANTIQ Simulator
Live Objects Data Generator Project

This tutorial guides a developer to define a Vantiq application that simulates data from different temperature sensors and push them to Live Objects.
This Data Simulator project is defined to be used with the Control Temperature Project that monitors Temperature in Cold Storage Rooms.
It is assumed that the developer has a working knowledge of the VANTIQ IDE. It is recommended that a new developer completes the lessons in the Introductory Tutorial before starting this tutorial.

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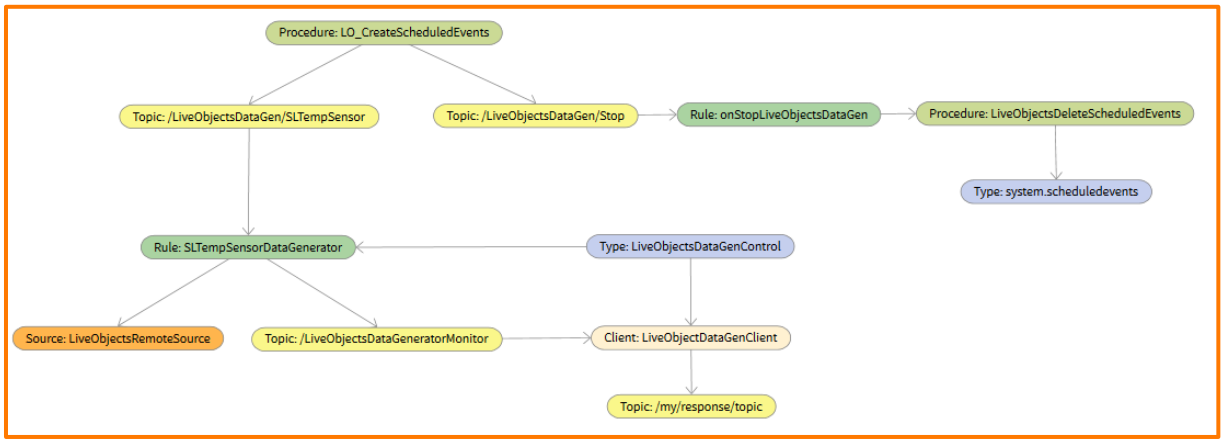
1. Introduction

Project Modelo Graphical View of the project



2. Create a new Project

Use the **Projects** button, select **Create New Project** and title the project "LiveObjectsDataGen".

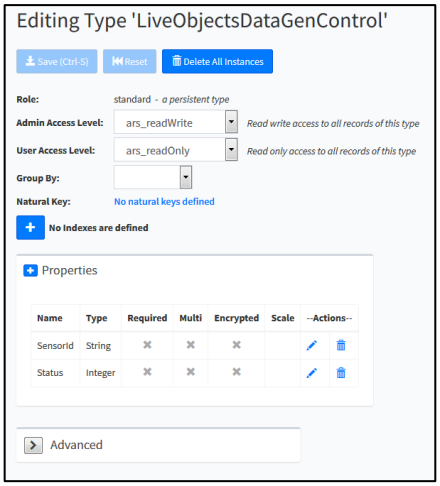
3. Create Data Types

A. Create a new data Type LiveObjectsDataGenControl

This datatype is used to define the simulated sensors and their status.
For the purpose of the application, the status are defined as follows:

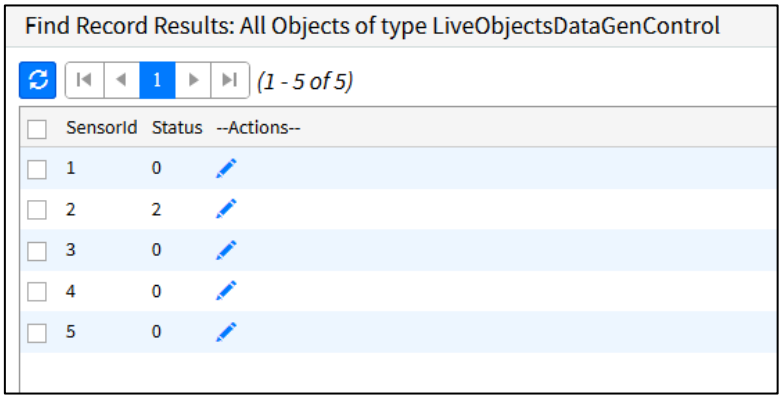
Normal Status for temperature below -19°C.
Risky Status for temperature comprised between -19°C and -15°C.
Critical Status for temperature above -15°C.

Use the **Add** button to select **Type…**
Use the **New Type** button to create the "LiveObjectsDataGenControl" datatype, and add the following properties.



B. Create Records to simulate 5 sensors

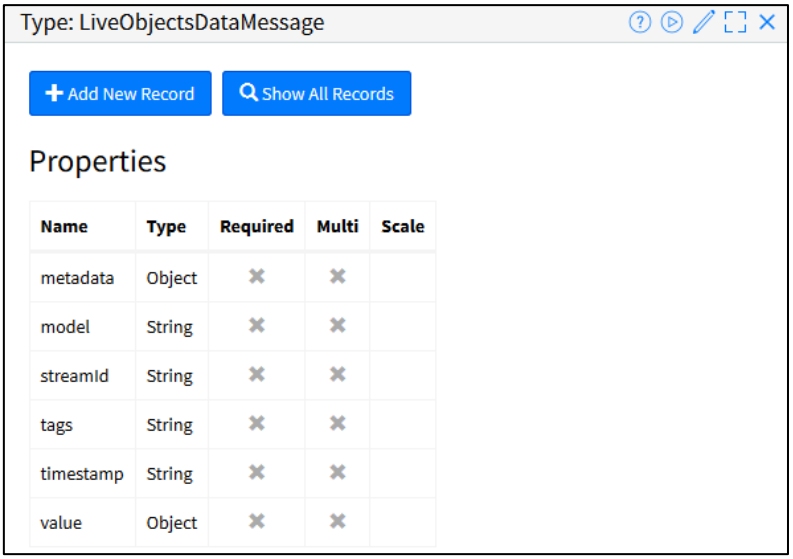
Use the **Add New Record button** to record 5 sensors, with an init status.
Status can be 0 or Normal, 1 for Risky, 2 for Critical.
The user will be able to update the status later through the Web application.



C. Create a new DataType LiveObjectsDataMessage

Use the **Add** button to select **Type…**

Use the **New Type** button to create the "LiveObjectsDataMessage" datatype and add the following properties.



Name	Type	Required	Multi	Scale
metadata	Object	✖	✖	
model	String	✖	✖	
streamId	String	✖	✖	
tags	String	✖	✖	
timestamp	String	✖	✖	
value	Object	✖	✖	

4. Define a procedure to generate triggers given frequency, for a given period

Use the **Add** button to select **Procedure**

The procedure triggers events on 2 topics

- 1st one : periodic events that will trigger data sending
- 2nd one : end of data simulation

Topics are automatically generated.

Procedure: LO_CreateScheduleEvents

```
PROCEDURE LO_CreateScheduleEvents(paramconfiguration)

PUBLISH { name: "TemperatureSE" } TO TOPIC "/LiveObjectDataGen
/SLTempSensor"
SCHEDULE {name: "TemperatureSEEvent", periodic: true, interval:
paramconfiguration.Frequency}


PUBLISH { name: "StopLiveObjectDataGen" } TO TOPIC "/LiveObjectDataGen
/Stop"  SCHEDULE {interval: paramconfiguration.ScheduleDuration}
```

Topic: /LiveObjectsDataGen/SLTempSensor

Name	/LiveObjectsDataGen/SLTempSensor
Publish Message	{ }

Publish

Topic: /LiveObjectsDataGen/Stop

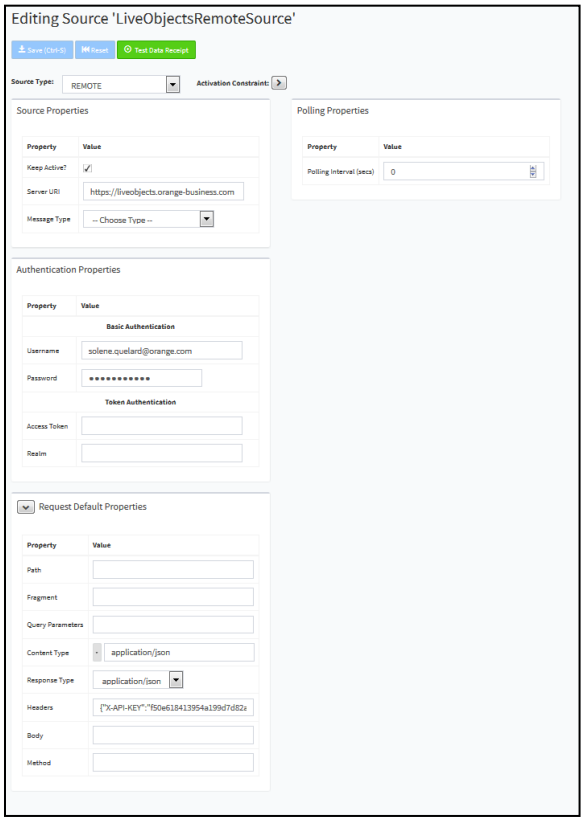
Name	/LiveObjectsDataGen/Stop
Publish Message	{ }

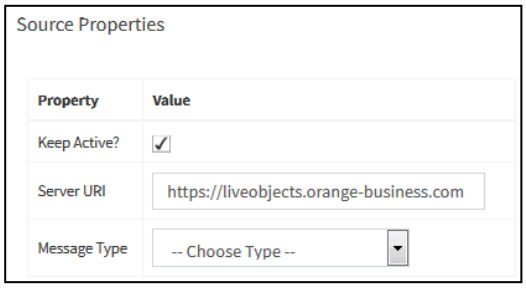
Publish

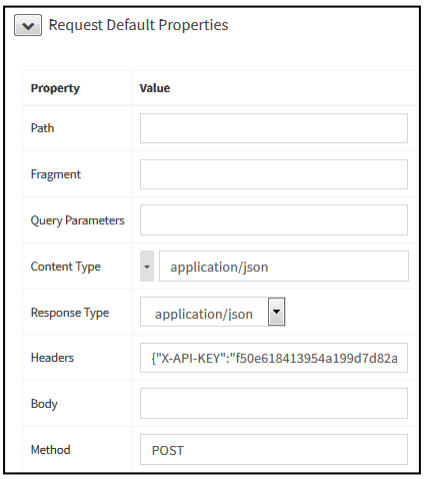
5. Create a source to push simulated data to Live Objects

Use the **Add** button to select **Source** and name it LiveObjectsRemoteSource**.**

Select **REMOTE** as Source Type.
In Source Properties :
Set the **Server URI** as https://liveobjects.orange-business.com
In Request Default Properties :
Set the **Content Type** as application/json
Set the **Response Type** as application/json
Set the **Headers** as {“X-API-KEY”:” your LiveObjects API Key”}
Set the **Method** to POST







6. Create a rule to generate data and push them to LiveObjects

Use the **Add** button to select **Rule**, name it SLTempSensorDataGenerator**.**

The rule will

- generate temperature values considering the status of the sensor stored in the LiveObjectsDataGenControl datatype.
- format data as a SensingLabs Temperature Sensor
- send simulated data to LiveObjects
- send simulated data to an internal topic that will be used by the client web app to print the generated data

```
RULE SLTempSensorDataGenerator WHEN PUBLISH OCCURS ON "/LiveObjectsDataGen/SLTempSensor"

log.info("SLTempSensorDataGenerator Start ")
try
{
            SELECT FROM LiveObjectsDataGenControl AS dc
            {
    var temp
    if (dc.Status == 2)
    {       temp = random(-14,0)
    }
    else
    {       if (dc.Status == 1)
        { temp = random(-18,-16)
        }
        else
        { temp = random(-28,-20)
        }
    }
    var data = {}
    var datavalue = {}
    var batterylevel = {}
    var tempinfo = {}
    var huminfo = {}
    var datanetwork = {}
    var loradatanetwork = {}
    var metadata = {}

    data.timestamp = now()
    data.model = "model_sensinglabs_senslab_v1"
    datavalue.payload = "034012131415440400"
    batterylevel.value = 10
    batterylevel.unit = "%"
    tempinfo.value = temp
    tempinfo.unit = "°C"
    huminfo.value = 3
    huminfo.unit = "%"
    datavalue.humidity = huminfo
    datavalue.temperature = tempinfo
    datavalue.batterylevel = batterylevel
    data.value = datavalue

    var loradeveui = "AAAA00000000000"+ dc.SensorId
    metadata.source = "urn:lora:"+ loradeveui
    loradatanetwork.devEUI = loradeveui
    datanetwork.lora = loradatanetwork
    metadata.network = datanetwork
    data.metadata = metadata
    data.tags = ["VantTests","Temp"]

    var sourcepath ="/api/v0/data/streams/urn:lora:"+ loradeveui+ "!uplink"
    var mondata = {}
    var internaldatainfo ={}
    internaldatainfo.Time = data.timestamp
    internaldatainfo.Id= loradeveui
    internaldatainfo.Temperature = stringify(tempinfo.value)+tempinfo.unit

    mondata.data = internaldatainfo

    PUBLISH {message : mondata} to TOPIC "/LiveObjectsDataGeneratorMonitor"

    PUBLISH { body:  data } TO SOURCE LiveObjectsRemoteSource USING  {path:sourcepath}
  }
}
catch (exception)
{
  log.info(stringify(exception))
}
```

7. Define a rule and a procedure to stop the scheduling

Use the **Add** button, select Rule, add a Rule and name it onStopLiveObjectsDataGen**.**

Rule: onStopLiveObjectsDataGen

```
RULE onStopLiveObjectsDataGen when PUBLISH OCCURS ON
"/LiveObjectsDataGen/Stop"

LiveObjectsDeleteScheduledEvents()

```

The Rule will be triggered on an event on the topic /LiveObjectsDataGen/Stop and calls a Procedure to stop the schedule events.

Use the **Add** button, select **Procedure**, add a Procedure and name it LiveObjectsDeleteScheduledEvents**.**

Procedure: LiveObjectsDeleteScheduledEvents

```
PROCEDURE LiveObjectsDeleteScheduledEvents()

try
{
    DELETE system.scheduledevents WHERE name ==
"TemperatureSEEvent"
}
catch (exception)
{
    log.info("exception")
}

```

This procedure will also be called by the Client Web App.

8. Create a client Web App to launch data simulation

A. Add document:

Add the Orange Logo in your workspace (the logo that will be used for the header of the web app)
In Show->Advanced-> Documents, add the OrangeLogo image with the following link public/images/OrangeLogo.png.

B. Create Client:

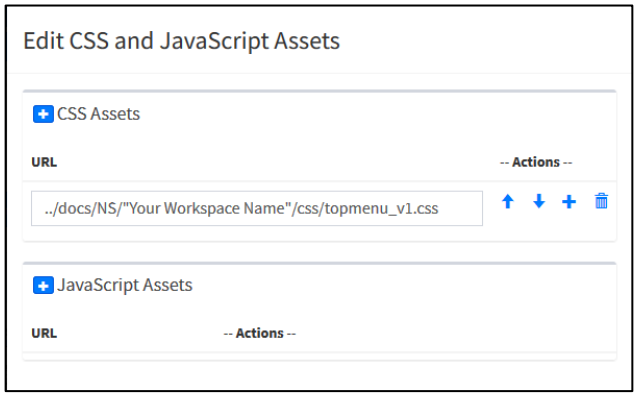
Use the **Add** button, select **Client,** add a new one and name it LiveObjectsDataGenerator**.**
Chose Design for browser Layout, and click OK.

C. Configure Properties:

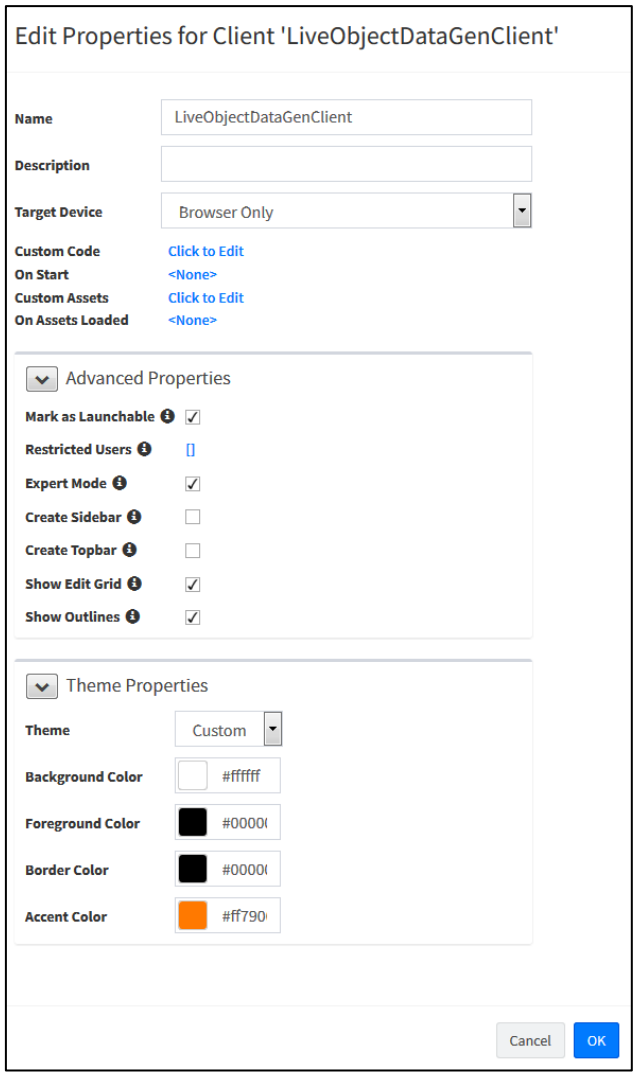
Add **Custom Code** to define the Orange Header and the Sensor DropList

```
$('.navbarIcon').css("background-image", "url(https://dev.vantiq.com/ui/docs/NS/YourNamespace/images/OrangeLogo.png)");
$(".navbarIcon").css("width", "60px");
$(".navbarIcon").css("height", "60px");
$('.navbarIcon').css("background-repeat", "no-repeat");

//$("#rtcTitle" ).remove();
$(".main-header .logo").css({'height':'60px'}); // Hauteur du bandeau du haut
$(".navbar").css("background-color", "#000000"); // Couleur de la barre de navigation
$(".logo").css("background-color", "#000000"); // Couleur du fond sous le logo + hauteur du bandeau
$(".skin-blue .main-header .navbar .nav > li > a").css("color", "#444444");  // Theme de la bare du haut, couleur de police du nom du user et
Namespace VANTIQ, au format CSS,


function refreshLiveObjectsDataGenControl(client)
{  var http = new Http();
  http.setVantiqUrlForResource("LiveObjectsDataGenControl");
 //
 //  Add the Authorization header to the request
//
http.setVantiqHeaders();
var args = {};
   //
   //  Execute the asynchronous server request. This expects 4 parameters:
   //
   //  resourceId: The "_id" of the object being loaded
   //  parameters: "null" or an object containing the parameters for this request
   //  successCallback: A callback function that will be driven when the request completes
   //                successfully (i.e. a status code of 2XX)
   //  failureCallback: A callback function that will be driven when the request does not complete
   //                successfully.
   //
 http.select(args,function(response)
   {
      //
      //  At this point "response" is the object found
      //
      console.log("SUCCESS: " + JSON.stringify(response));
      client.sendClientEvent("CurrentLiveObjectsDataGenControlStream", response);

      var SensorDL = client.getWidget("SensorDropList");
                              var enumList = [];


      var arrayLength = response.length;
                              if (arrayLength > 0)
         {
               enumList.push({value:0, label: "Select a SensorId"});
            for (var i = 0; i < arrayLength; i++)
               {
                  enumList.push({value:response[i]._id, label: "SensorId " + response[i].SensorId});
               }
         }
      else
   {
               enumList.push({value:0, label: "No Sensor defined"});

         }
      SensorDL.enumeratedList = enumList;
      Binding.applyChanges();
   },
   function(errors)
   {
      //
      //  This call will format the error into a popup dialog
      //
      client.showHttpErrors(errors,"Doing a select on a single'LiveObjectsDataGenControl'");
   }):
```

Add Custom Asset to add a specific .css if wanted .
The .css needs to be previously added in the documents of the workspace (Show -> Advanced -> Documents) with the following link public/css/topmenu_V1.css.



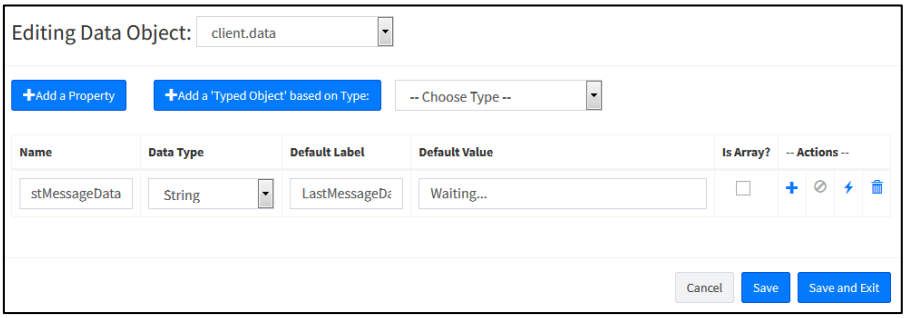
Set **Mark as Launchable** and **Expert Mode** in Advanced Properties **, and** Theme Properties as defined below.



D. Configure Data Objects

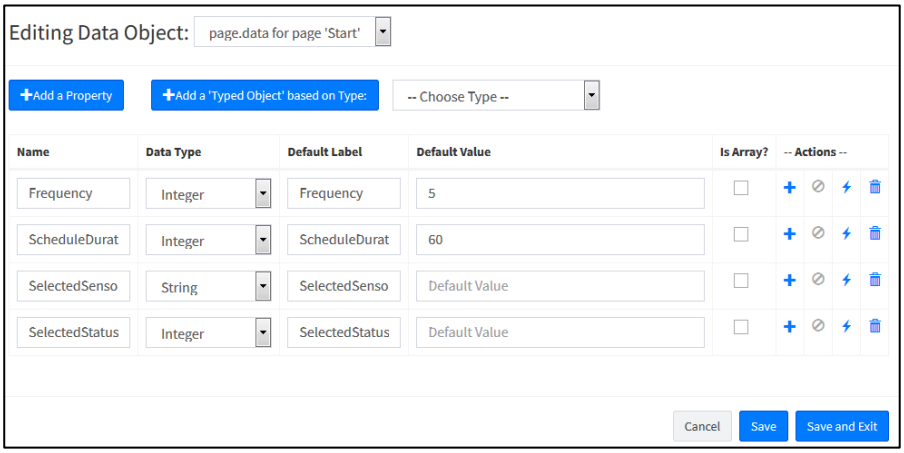
Add a Property in **Data Objects** / **Client.data**

- a string LastMessageData for the print of the last generated data, with default value "Waiting…"



Add a Property in **Data Objects** / **page.data** for Page Start

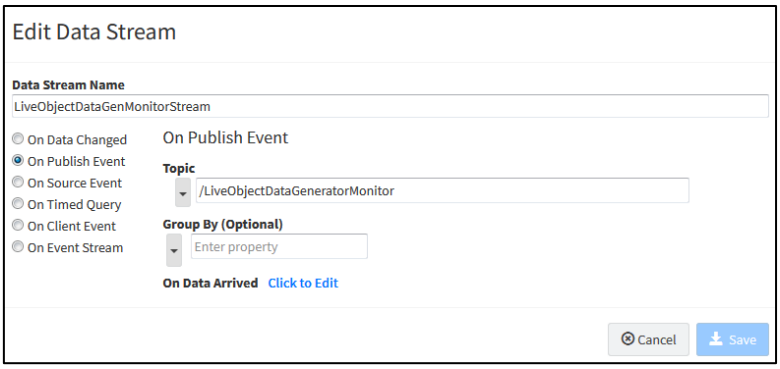
- an integer Frequency , with default value 5 (for 5 seconds)
- an integer ScheduleDuration, with default value 30 (30 seconds)
- a string SelectedSensorId
- an integer SelectedStatus



E. Configure Data Streams

Add in Data Streams

- a publish event **LiveObjectsDataGenMonitorStream ,** on topic /LiveObjectsDataGeneratorMonitor

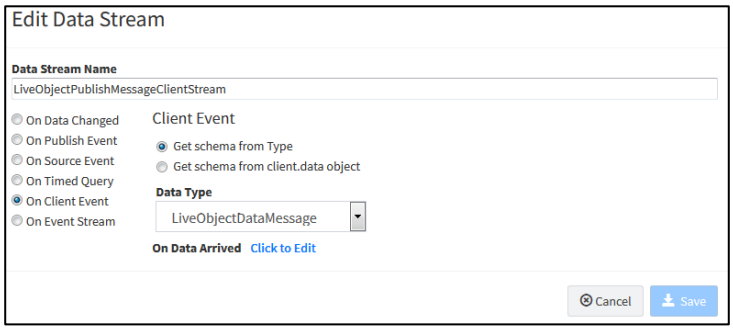


with the following code to execute on data arrival:

Edit JavaScript for the 'onDataArrived' event on DataStream 'LiveObjectDataGenMonitorStream'

```
//
//  This function is called on Data Stream 'LiveObjectDataGenMonitorStream'
//  whenever new data arrives on the stream. (Note that 'this' points to the
//  DataStream object.)
//
function DataStream_LiveObjectDataGenMonitorStream_onDataArrived(client,data)
{
var msg = {};

msg.Message = JSON.stringify(data.message.data);
client.sendClientEvent("LiveObjectPublishMessageClientStream", msg);
client.data.LastMessageData = JSON.stringify(data.message.data,null,2);
Binding.applyChanges();
```

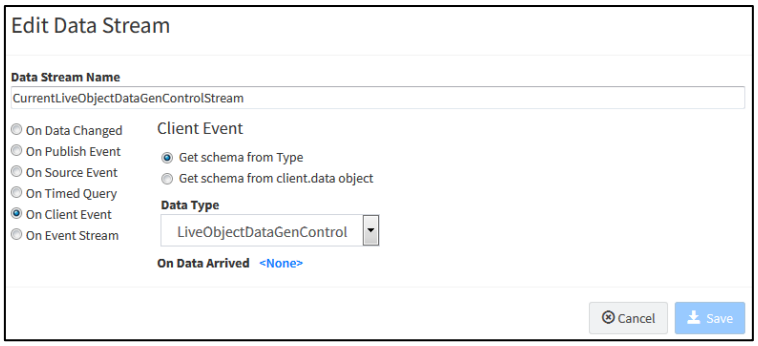
- a client event **LiveObjectsPublishMessageClientStream** to print the message



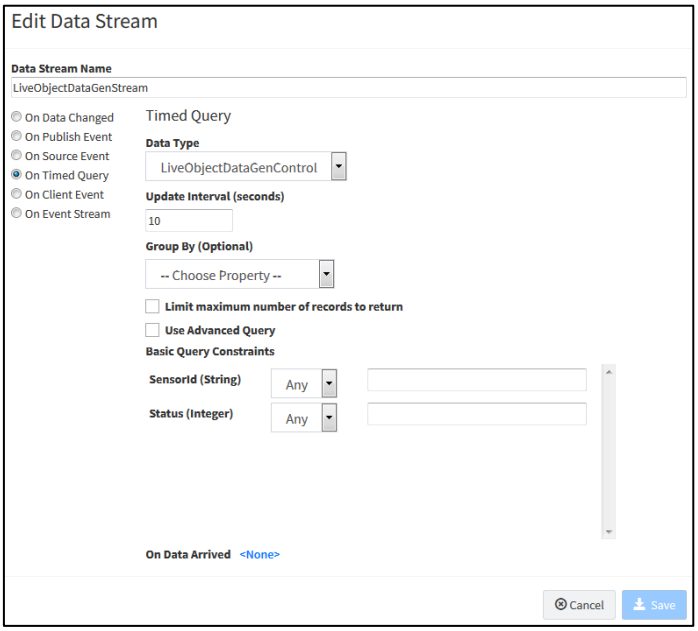
with the following code to execute on data arrival:

'LiveObjectPublishMessageClientStream'

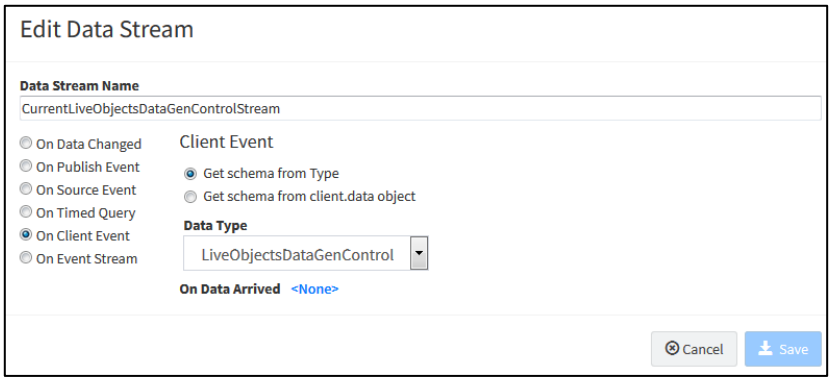
```
//
//  This function is called on Data Stream 'LiveObjectPublishMessageClientStream'
//  whenever new data arrives on the stream. (Note that 'this' points to the
//  DataStream object.)
//
function DataStream_LiveObjectPublishMessageClientStream_onDataArrived(client,data)
{
console.log(JSON.stringify(data));
```



- an on Timed Query event **LiveObjectsDataGenStream** to get the information from LiveObjectsDataGenControl DataType (Query every 10 seconds)



- a Client Event DataStream CurrentLiveObjectsDataGenControlStream used in the custom code for handling the sensor drop list.



F. Configure Page Properties (Start Page Properties)

Edit **Properties** on **Page Start** and set on On Start

Edit JavaScript for the 'onStart' event on page 'Start'

```
//
//  This function is called when page 'Start' first begins executing. (Note
//  that 'this' points to the Page object. 'parameters' is passed by calling
//  client.gotoPage or client.returnToCallingPage.)
//
function Client_Start_onStart(client,parameters)
{
```

```
1 refreshLiveObjectsDataGenControl(client);
```

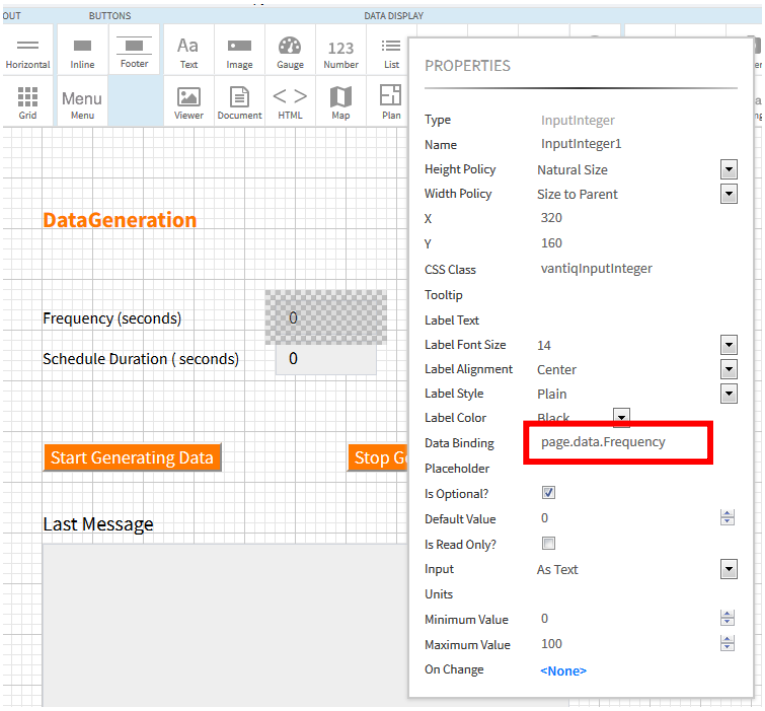
G. Create Start Page with widget selection

- ### Data Generation

Add **Static Text** box , with Text "DataGeneration", Font Size 22, Font Weight Bold , Font Color Custom #ff7900

Add **Static Text** box with Text "Frequency (seconds)" , Font Size 16.
Add on its right an **Integer Data Input** with DataBinding to "page.data.Frequency"

Add a **Static Text** box with Text "Schedule Duration (seconds)", Font Size 16.
Add on its right an **integer Data Input** with DataBinding to "page.data.ScheduleDuration"



This enables to set the frequency and duration of data generation.

Add a **inline button** with button label “Start Generating Data” , Button Background Color set to Custom #ff7900 , Button Label Color set to White, and on Click function that calls the LO_CreateScheduledEvents procedure (code below).

```
//
  // Create an instance of the Http class to execute our server request
  //
  var http = new Http();
  //
  // Build the URL needed to do an "execute" of a Procedure
  //
  http.setVantiqUrlForSystemResource("procedures");
  //
  // Add the Authorization header to the request
  //
  http.setVantiqHeaders();
  //
  // Set the Procedure arguments
  //
        var args= [
        { "Frequency": page.data.Frequency*1000,
              "ScheduleDuration": page.data.ScheduleDuration*1000
              }
        ];
  //
  // Execute the asynchronous server request. This expects 4 parameters:
  //
  // procedureArguments: The procedure arguments.
  // procedureName: The fully-qualified name of the Procedure.
  // successCallback: A callback function that will be driven when the request completes
  //            successfully (i.e. a status code of 2XX)
  // failureCallback: A callback function that will be driven when the request does not complete
  //            successfully.
  //
  http.execute(args,"LO_CreateScheduledEvents",function(response)
  {
    //
    // At this point "response" is results of the Procedure call
    //
    console.log("SUCCESS: " + JSON.stringify(response));
  },
  function(errors)
  {
    //
    // This call will format the error into a popup dialog
    //
    client.showHttpErrors(errors,"Executing 'LO_CreateScheduledEvents'");
  });
```

Add a **inline button** with Button Label “Stop GeneratingData”, Button Background Color set to Custom #ff7900 , Button Label Color set to White, and on Click function that calls the LiveObjectsDeleteScheduledEvents procedure (code below).

```
//
  //  Create an instance of the Http class to execute our server request
  //
  var http = new Http();
  //
  //  Build the URL needed to do an "execute" of a Procedure
  //
  http.setVantiqUrlForSystemResource("procedures");
  //
  //  Add the Authorization header to the request
  //
  http.setVantiqHeaders();

  //
  //  Set the Procedure arguments
  //
  var args = {};

  //
  //  Execute the asynchronous server request. This expects 4 parameters:
  //
  //  procedureArguments: The procedure arguments.
  //  procedureName: The fully-qualified name of the Procedure.
  //  successCallback: A callback function that will be driven when the request completes
  //                   successfully (i.e. a status code of 2XX)
  //  failureCallback: A callback function that will be driven when the request does not complete
  //                   successfully.
  //
  http.execute(args,"LiveObjectsDeleteScheduledEvents",function(response)
  {
    //
    //  At this point "response" is results of the Procedure call
    //
    console.log("SUCCESS: " + JSON.stringify(response));
    client.data.LastMessageData = "Waiting...";
  },
  function(errors)
  {
    //
    //  This call will format the error into a popup dialog
    //
    client.showHttpErrors(errors,"Executing 'LiveObjectsDeleteScheduledEvents'");
  });
```

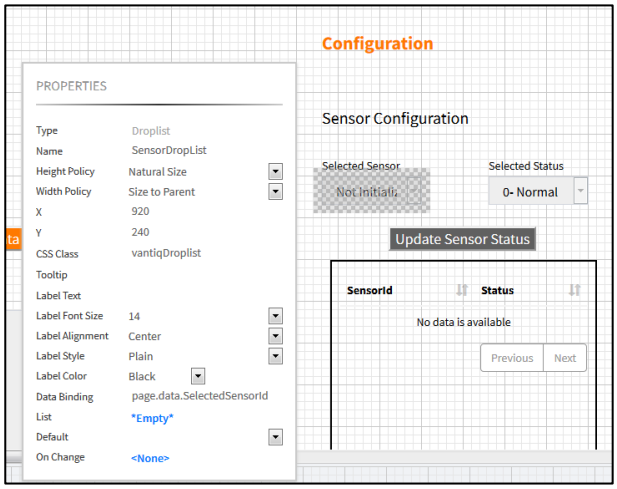
Add a **Static Text** box with Text “Last Message”, Font Size 20.
Add a **vantiqMultiligneInput**, with Width Policy set to Explicit, and Width to 540 , with DataBinding to “client.data.LastMessageData” to print the data generated.

- ## Sensors Configuration

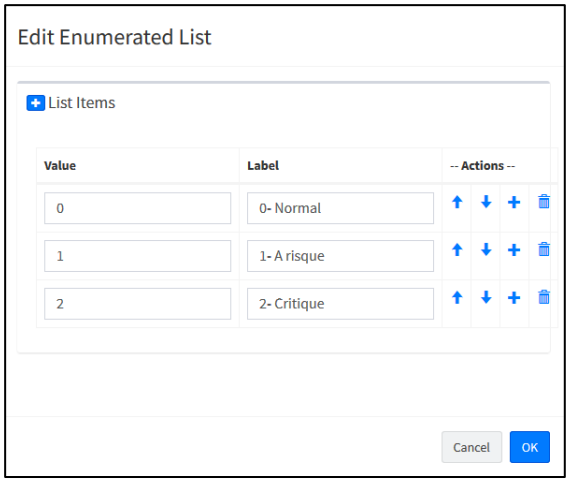
Add **Static Text**, with Text “Configuration”, Font Size 22, Font Weight Bold , Font Color Custom #ff7900

Add **Static Text**, with Text “Sensor Configuration”.

Add a **Label**, with Label Text “Selected Sensor”, Font Size 14.
Add a **dropList** , just below, with Name “SensorDropList”, with DataBinding to “page.data.SelectedSensorId”



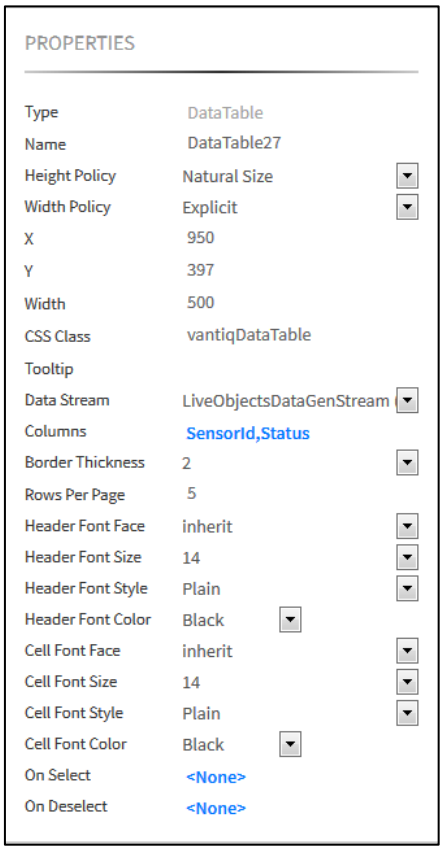
Add a **Label** on the right, with Label Text “Status”, Font Size 14.
Add a **dropList** just below with DataBinding to “page.data.SelectedStatus”, and Enumerated list set to 0-Normal,1-Risky,2-Critical :



Add a **Inline Button** , with Button Label “Update SensorStatus” to set the status of Selected Sensor, with onclick function below.

```
//
  //  Create an instance of the Http class to execute our server request
  //
  var http = new Http();
  //
  //  Build the URL needed to do an "update" on our Type
  //
  http.setVantiqUrlForResource("LiveObjectsDataGenControl");
  //
  //  Add the Authorization header to the request
  //
  http.setVantiqHeaders();
        var updateData = {};
        updateData.Status = page.data.SelectedStatus;
  //
  //  Execute the asynchronous server request. This expects 4 parameters:
  //
  //  data: The object being inserted.
  //  parameters: "null" or an object containing the parameters for this request
  //  successCallback: A callback function that will be driven when the request completes
  //              successfully (i.e. a status code of 2XX)
  //  failureCallback: A callback function that will be driven when the request does not complete
  //              successfully.
  //
  http.update(updateData,page.data.SelectedSensorId,function(response)
  {
    //
    //  At this point "response" is the updated object
    //
    console.log("SUCCESS: " + JSON.stringify(response));
  },
  function(errors)
  {
    //
    //  This call will format the error into a popup dialog
    //
    client.showHttpErrors(errors,"Doing an update of sensor status 2");
  });

  ds = client.getDataStreamByName("LiveObjectsDataGenStream");
  ds.restart();
```

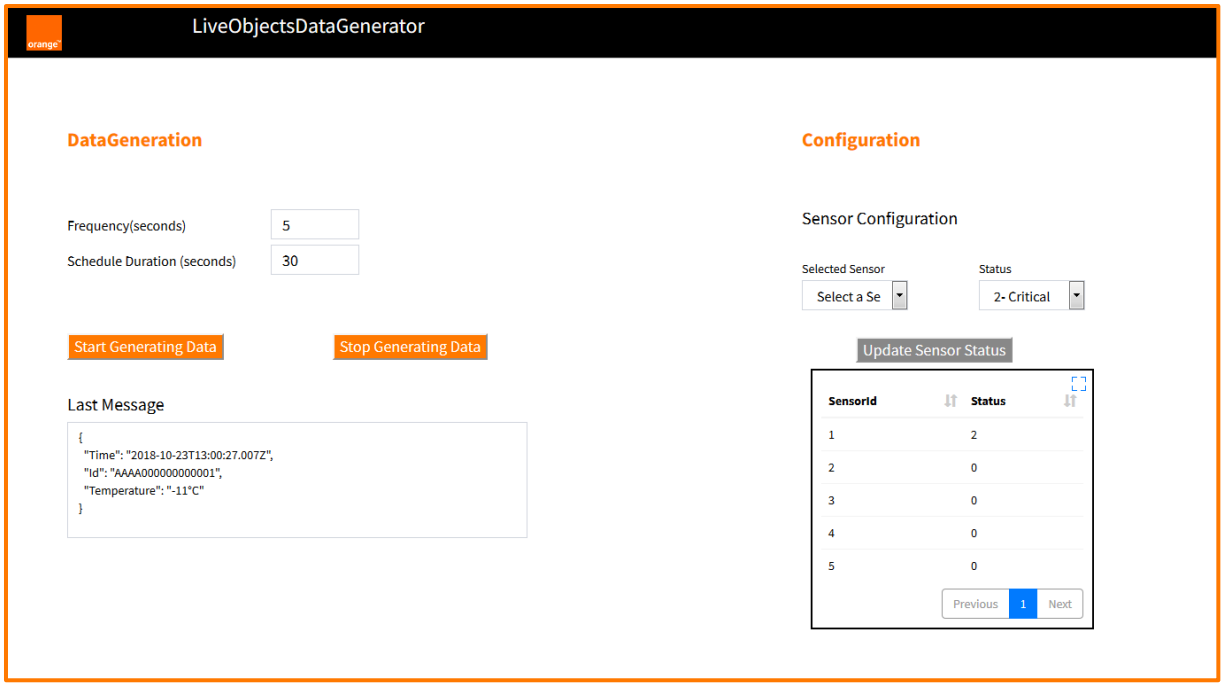
Add a **Data Table** to see the current Status of the different Sensors,
with DataStream set to “LiveObjectsDataGenStream”
with Columns : SensorId, Status



H. Launch LiveObjectsDataGenerator

Go to https://dev.vantiq.com/ui/rtc/index.html#/home.

Launch LiveObjectsDataGenerator Client.
Configure the sensors status, and press the button Start Generating Data.



In your Live Objects account, in Data section, you should see the incoming stream from your devices.

Date	Source	Value	Fcnt	Port	Rssi, Snr, Sf	Tags	Network signal
11/05/2018 11:37:15 AM	urn:lora:AAAA000000000005	034012131415440400	-	-	-	Temp VantTests	-
11/05/2018 11:37:15 AM	urn:lora:AAAA000000000004	034012131415440400	-	-	-	Temp VantTests	-
11/05/2018 11:37:15 AM	urn:lora:AAAA000000000003	034012131415440400	-	-	-	Temp VantTests	-
11/05/2018 11:37:13 AM	urn:lora:AAAA000000000002	034012131415440400	-	-	-	Temp VantTests	-
11/05/2018 11:37:13 AM	urn:lora:AAAA000000000001	034012131415440400	-	-	-	Temp VantTests	-

The details of the data are as shown below.


```
{
   "metadata": {
      "connector": "http",
      "source": "urn:lora:AAAA000000000005"
   },
   "streamId": "urn:lora:AAAA000000000005!uplink",
   "created": "2018-11-05T10:37:16.426Z",
   "extra": null,
   "location": null,
   "model": "model_sensinglabs_senslab_v1",
   "id": "5be01d5c7676a73dde1710ad",
   "value": {
      "payload": "034012131415440400",
      "temperature": {
         "unit": "°C",
         "value": -24
      },
      "humidity": {
         "unit": "%",
         "value": 3
      },
      "batterylevel": {
         "unit": "%",
         "value": 10
      }
   },
   "timestamp": "2018-11-05T10:37:15.743Z",
   "tags": [
      "VantTests",
      "Temp"
   ]
}
```