Delta Electronics Inc.

UNOcentral

MQTT API Manual

Version 0.1

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1. Introduction

UNOcentral is the central server to monitor the multiple UNO sensors. It provides MQTT Data Payload to retrieve the UNOnext sensor values for engineer using. Basic UNO sensor model has following sensors: Temperature (°C/°F), Humidity (rH%), CO_2 (ppm), PM2.5 (μg/m^3), PM10 (μg/m^3). The advance model optionally provides highly accuracy NTC temperature (°C), CO (ppm), HCHO (ppm), TVOC (ppm), O_3 (ppm), PM1 (μg/m^3). This document introduces to use MQTT client to retrieve the sensor data based on JSON format. The sensor data include real-time and average data (only air quality related sensors). Note, please upgrade your UNOcentral firmware for the latest functions support. First support firmware version is v1.3.3.

2. How to Use

A. Requirements

Please use MQTT client to connect UNOcentral local broker, the connection settings are bellowed.

- Protocol: TCP (e.g. mqtt://)
- IP: follow UNOcentral network settings, may be checked by network manager or IT personnel.
- Port: 1883
- SSL/TLS is not supported, no certificate.
- Username: isdunocentral
- Password: hellocentralmqtt

In following figures, we use the MQTT Explorer as the demo client.

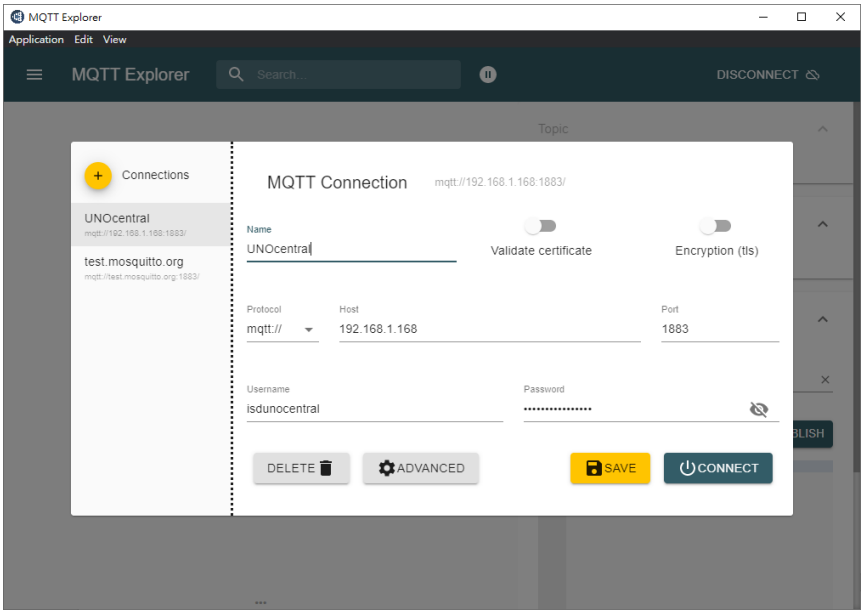


Figure 1 MQTT Connection Settings

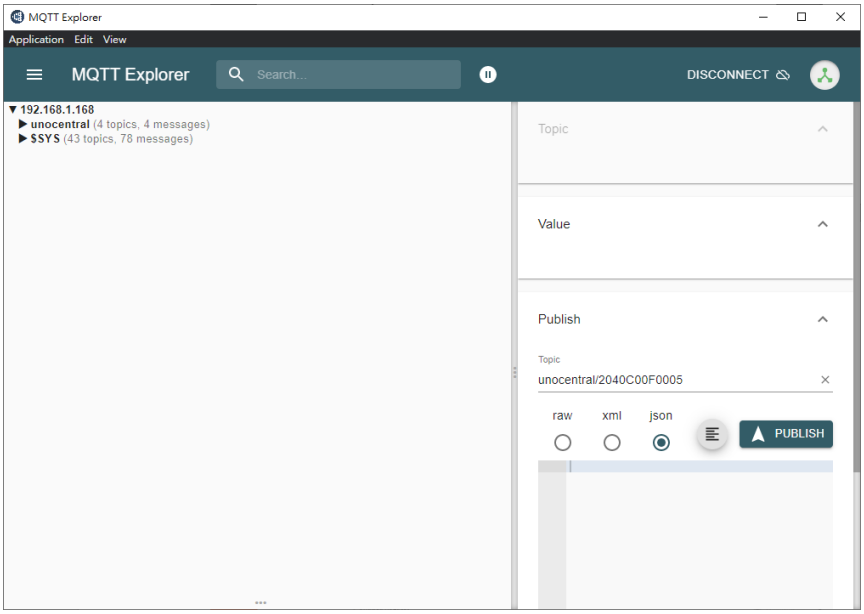


Figure 2 Data in Explorer after Connection

B. MQTT Data Topics

When the client connects to the UNOcentral local broker, the topics need to be subscribed is listed, and then the client will get the data published by UNOcentral.

Table 1 Main MQTT topics

Topic	Description
UNOcentral/[**SN**]/nextData/[**IDX**]/data E.g. unocentral/2040C00F9999/nextData/0/data	One UNOnext' s data payload based on JSON format. [SN] means UNOcentral' s serial number; [IDX] means the connection order of UNOnext under UNOcentral. The range of [IDX] is from 0~15 or 0~31 based on UNOcentral model.
UNOcentral/[**SN**]/nextData/data E.g. unocentral/2040C00F9999/nextData/data	Array of all UNOnext' s data payload based on JSON format. [SN] means UNOcentral' s serial number.

- Only the data of enabled UNOnexts in the UNOcentral setting will be published with topic UNOcentral/[SN]/nextData/[IDX]/data.
- Only the data of enabled UNOnexts in the UNOcentral setting will be filled into the payload of topic UNOcentral/[SN]/nextData/data. Otherwise the value of the array index is **NULL**.

The [IDX] is ranged from 0 ~ 15 (31) corresponded to the Slave ID: 208 ~ 223 (239) or ID: 1 ~ 16 (32) according to UNOcentral which is in RS485 mode or MQTT mode as the following table.

Table 2 The [IDX] in topic and payload array corresponds to slave Id and ID

[IDX]	**UNOcentral Link Mode**	
	Slave ID in RS485 mode	ID in MQTT mode
0	208	1
1	209	2
~		
15	223	16
~		
31	239	32

- If UNOnext publishes data to the UNOcentral broker, please refer to UNOnext MQTT user guide to understand to how to handle UNOnext data payload.
- Engineers can choose which topic they need according to customer requirements.

C. Data Format

The main data topics are listed.

- Single Data Format: UNOcentral/[SN]/nextData/[IDX]/data

From IDX = 0 to IDX = 15 (31), publish one data once per second or per 0.5 second, and all data will be published one round about 16 ~ 20 seconds

- All Packed Data Format: UNOcentral/[SN]/nextData/data

Pack all UNOnext data into the array and publish per 16 ~ 20 seconds. The index in the array is corresponded to [IDX].

Table 1 Presents the valid/un-valid values to help engineer to check the sensor status.

Topic: UNOcentral/[SN]/nextData/[IDX]/data

Payload Format：

One UNOnext data based on JSON format.

Important Keys Description

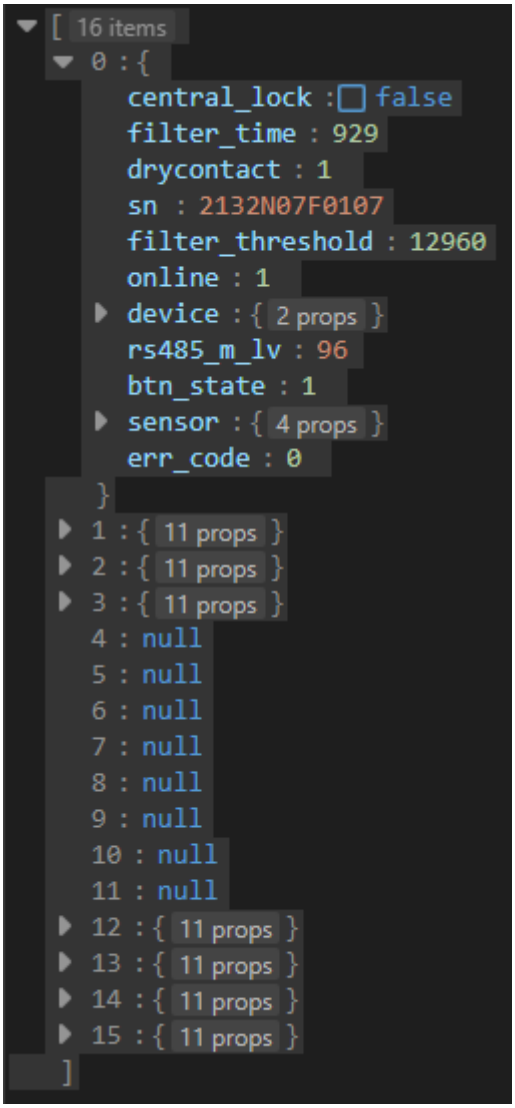
<table>
<tr><th>Key</th><th>Description</th></tr>
<tr><td>sn</td><td>Serial number of UNOnext/UNOlite</td></tr>
<tr><td>online</td><td>1 means online, and 0 means offline</td></tr>
<tr><td>error_code</td><td>The UNOnext error code.</td></tr>
<tr><td>sensor.environment</td><td>Array of environment sensor data.
E.g.: [v0, v1, v2, v3, v4, v5].
<table>
<tr><th>Index</th><th>Sensor Value</th><th>Unit</th></tr>
<tr><td>0</td><td>Temperature</td><td>°C</td></tr>
<tr><td>1</td><td>Temperature NTC</td><td>°C</td></tr>
<tr><td>2</td><td>Humidity</td><td>%rH</td></tr>
<tr><td>3</td><td>Lux</td><td>Lux</td></tr>
<tr><td>4</td><td>Temperature</td><td>°F</td></tr>
<tr><td>5</td><td>Temperature NTC</td><td>°F</td></tr>
</table>
Please refer to Table 3 if the value is error code.</td></tr>
<tr><td>sensor.realtime</td><td>Array of real-time IAQ sensor data.
E.g.: [v0, v1, v2, v3, v4, v5, v6, v7].
<table>
<tr><th>Index</th><th>Sensor</th><th>Unit</th></tr>
<tr><td>0</td><td>CO_2</td><td>ppm</td></tr>
<tr><td>1</td><td>CO (opt.)</td><td>ppm</td></tr>
<tr><td>2</td><td>HCHO (opt.)</td><td>ppm</td></tr>
<tr><td>3</td><td>TVOC (opt.)</td><td>ppm</td></tr>
<tr><td>4</td><td>O_3 (opt.)</td><td>ppm</td></tr>
<tr><td>5</td><td>PM10</td><td>$\mu g/m^3$</td></tr>
<tr><td>6</td><td>PM2.5</td><td>$\mu g/m^3$</td></tr>
<tr><td>7</td><td>PM1 (opt.)</td><td>$\mu g/m^3$</td></tr>
</table>
Please refer to Table 3 if the value is error code.</td></tr>
<tr><td>sensor.regulation</td><td>Array of real-time IAQ sensor data.
E.g.: [v0, v1, v2, v3, v4, v5, v6, v7].
<table>
<tr><th>Index</th><th>Sensor</th><th>Unit</th><th>Moving Average</th></tr>
<tr><td>0</td><td>CO_2</td><td>ppm</td><td>8 hours</td></tr>
<tr><td>1</td><td>CO (opt.)</td><td>ppm</td><td>8 hours</td></tr>
<tr><td>2</td><td>HCHO (opt.)</td><td>ppm</td><td>1hour</td></tr>
<tr><td>3</td><td>TVOC (opt.)</td><td>ppm</td><td>1hour</td></tr>
<tr><td>4</td><td>O_3 (opt.)</td><td>ppm</td><td>8 hours</td></tr>
<tr><td>5</td><td>PM10</td><td>$\mu g/m^3$</td><td>24 hours</td></tr>
</table></td></tr>
</table>

	6	PM2.5	μg/m^3	24 hours
	7	PM1 (opt.)	μg/m^3	24 hours
	Please refer to Table 3 if the value is error code.			

Topic: UNOcentral/[SN]/nextData/data

Payload Format：

All UNOnext data packed into an array based on JSON format.



Size of array is 16 or 32, and the index is from 0 to 15 or 0 to 31 referred to Table 2. Data format of each item in this array is same as the **single data format**. The null value of one index means the UNOnext is not enabled.

Table 3 Sensor Value Description

Name	Value	Description
SENSOR_ERROR_CODE	-99999	Sensor Initialized.
SENSOR_UNMOUNTED	-40000	Sensor unmounted
DATA_ABNORMAL	-50000	Sensor data abnormal
SENSOR_INIT_CODE	< -30000	Other error code
NORMAL_DATA	Others	Normal data